

US008464628B2

(12) **United States Patent**
Potterfield et al.

(10) **Patent No.:** **US 8,464,628 B2**
(45) **Date of Patent:** **Jun. 18, 2013**

(54) **ATTACHMENT MECHANISMS FOR
COUPLING FIREARMS TO SUPPORTING
STRUCTURES**

(75) Inventors: **Russell A. Potterfield**, Columbia, MO
(US); **Tim Kinney**, Columbia, MO (US);
Dennis Cauley, Boonville, MO (US);
Yan-Jiang Zhou, Columbia, MO (US)

(73) Assignee: **Battenfeld Technologies, Inc.**,
Columbia, MO (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **12/916,129**

(22) Filed: **Oct. 29, 2010**

(65) **Prior Publication Data**

US 2011/0036236 A1 Feb. 17, 2011

Related U.S. Application Data

(62) Division of application No. 12/209,113, filed on Sep.
11, 2008, now Pat. No. 7,845,267.

(60) Provisional application No. 60/971,507, filed on Sep.
11, 2007.

(51) **Int. Cl.**
F41A 23/14 (2006.01)

(52) **U.S. Cl.**
USPC **89/40.06**; 89/37.04

(58) **Field of Classification Search**
USPC 89/40.06, 37.03, 37.04, 37.11, 37.14
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

197,397 A 11/1877 O'Neil
387,411 A 8/1888 Gisel

399,604 A 3/1889 Dufner et al.
499,315 A 6/1893 Borchardt
568,543 A 9/1896 Parks
668,219 A 2/1901 Rock
691,912 A 1/1902 McClean
718,865 A 1/1903 Northcraft
778,865 A 1/1905 Hyenga
789,909 A 5/1905 Herold
1,033,624 A 7/1912 Schmeisser
1,061,577 A 5/1913 Whitney
1,088,362 A 2/1914 Perkins
1,089,307 A 3/1914 Benet et al.
1,121,945 A 12/1914 Smith
1,145,585 A 7/1915 Hebard

(Continued)

FOREIGN PATENT DOCUMENTS

DE 838872 C 5/1952
EP 0624455 A2 11/1994
GB 475080 A 11/1937

OTHER PUBLICATIONS

U.S. Appl. No. 11/739,077, filed Apr. 23, 2007, Cauley et al.

(Continued)

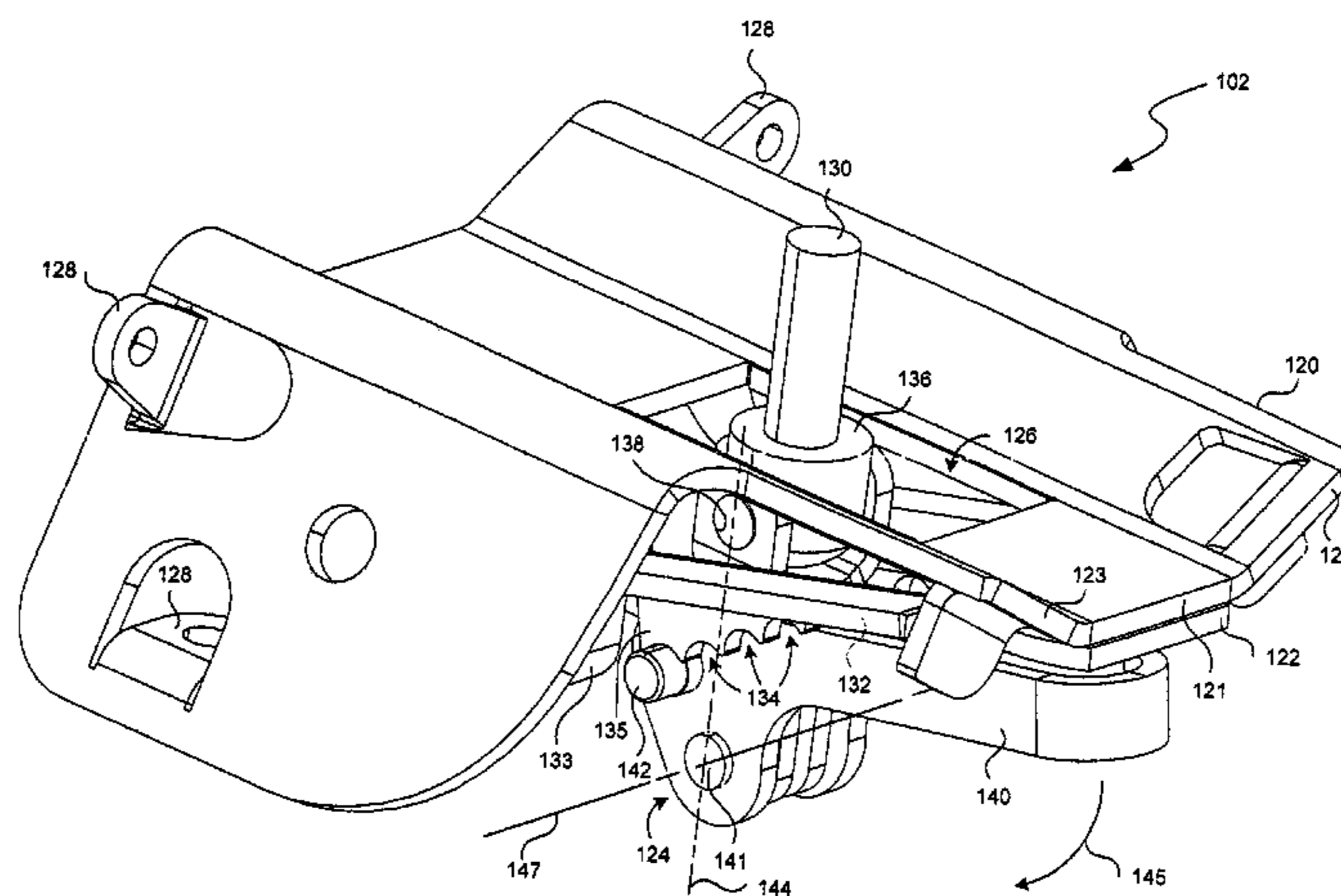
Primary Examiner — Stephen M Johnson

(74) *Attorney, Agent, or Firm* — Senniger Powers LLP

(57) **ABSTRACT**

Attachment mechanisms for attaching firearms to support structures are disclosed herein. In one embodiment, an attachment mechanism for attaching a firearm to a support structure includes an interface member coupled to a latching subassembly. The latching subassembly includes having an attachment portion and a latching arm. The attachment portion is configured to engage a connector fastened to the firearm through the aperture, and the latching arm lockably retains the attachment portion proximate to the interface member.

18 Claims, 7 Drawing Sheets



U.S. PATENT DOCUMENTS							
1,175,692	A	3/1916	Boicourt	3,163,420	A	12/1964	Braun
1,187,325	A	6/1916	Ivey	3,175,456	A	3/1965	Goodsell
1,195,777	A	8/1916	Burtin	3,183,617	A	5/1965	Ruger et al.
1,250,215	A	12/1917	Panos	3,205,518	A	9/1965	Romaine
1,256,255	A	2/1918	Porter	3,206,885	A	9/1965	Dye
1,295,688	A	2/1919	Butler	3,225,656	A	12/1965	Flaherty et al.
1,367,353	A	2/1921	Craig	D203,680	S	2/1966	Allison
1,457,407	A	6/1923	Stokes	3,240,103	A	3/1966	Lamont
1,488,647	A	4/1924	Quinn	3,259,986	A	7/1966	Carr
1,491,604	A	4/1924	Fuller	3,283,425	A	11/1966	Boyd
1,639,722	A	8/1927	Whitney	3,283,643	A	11/1966	Mittelsteadt
1,693,289	A	11/1928	Warren	3,291,317	A	12/1966	Bowen
1,736,244	A	11/1929	Baker	3,292,293	A	12/1966	Chiasera et al.
1,902,040	A	3/1933	Meyer	3,320,848	A	5/1967	Ponsness
1,907,181	A	5/1933	Fey	3,323,246	A	6/1967	Loffler
1,927,876	A	9/1933	Meyer	3,327,422	A	* 6/1967	Harris 42/94
1,928,871	A	10/1933	Swebilius	3,330,561	A	7/1967	Kandel
2,066,218	A	12/1936	Morgan	3,343,411	A	9/1967	Lee
2,079,510	A	5/1937	King et al.	3,353,827	A	11/1967	Dun, Jr.
2,090,930	A	8/1937	Chubb	3,358,504	A	12/1967	Freebairn
2,100,514	A	11/1937	Miller	3,370,852	A	2/1968	Kandel
2,121,982	A	6/1938	Pugsley	3,406,969	A	10/1968	Tisdell et al.
2,125,353	A	8/1938	Mattson	3,423,092	A	1/1969	Kandel
2,216,766	A	10/1940	Cook	D215,311	S	9/1969	Born
2,232,743	A	2/1941	Swenson	3,486,752	A	12/1969	Colvin
2,297,993	A	10/1942	Tratsch	3,499,525	A	3/1970	Kanter
2,331,372	A	10/1943	Buchanan	3,510,951	A	5/1970	Dow
2,427,365	A	3/1944	Meister	3,513,604	A	5/1970	Matsunaga et al.
2,378,545	A	6/1945	Fraser et al.	3,536,160	A	10/1970	Brewer
D147,305	S	8/1947	Sloan	3,550,941	A	12/1970	Spiro et al.
2,432,519	A	12/1947	Garand	3,556,666	A	1/1971	Lichenstern
2,451,266	A	10/1948	Whittemore	D220,154	S	3/1971	Irelan
2,455,644	A	12/1948	Barnes	3,572,712	A	3/1971	Vick
2,476,078	A	7/1949	Banks	3,580,127	A	5/1971	Lee
2,479,354	A	8/1949	Hanson	3,736,243	A	5/1971	Duggan
2,483,089	A	9/1949	Ferguson	3,583,556	A	6/1971	Wagner
2,484,801	A	10/1949	Anderson	3,584,820	A	6/1971	Butcher, Sr.
2,508,951	A	5/1950	Kazimier	3,587,193	A	6/1971	Lewis
2,510,380	A	6/1950	Clifford	3,608,225	A	9/1971	Manuel
2,517,268	A	8/1950	Wilson	3,609,902	A	10/1971	Casull
2,582,140	A	1/1952	Leek	3,646,704	A	3/1972	Ellsworth
3,064,976	A	11/1952	Kuhn	3,648,909	A	3/1972	Wisecarver
2,638,676	A	5/1953	Callahan	3,680,266	A	8/1972	Shiplov
2,677,207	A	5/1954	Stewart	3,680,354	A	8/1972	Phillips, Jr.
2,701,930	A	2/1955	Dolan	3,711,955	A	1/1973	Holt
2,729,975	A	1/1956	Hawthorne	3,711,984	A	1/1973	Dyer et al.
2,731,829	A	1/1956	Wigington et al.	3,738,101	A	6/1973	Simon-Vermot
2,740,530	A	4/1956	Ponder	3,739,515	A	6/1973	Koon, Jr.
2,753,642	A	7/1956	Sullivan	3,743,088	A	7/1973	Henkin
2,774,090	A	12/1956	Allinson	3,744,292	A	7/1973	Michelson
2,774,563	A	12/1956	Pribis	3,745,875	A	7/1973	Kennedy et al.
2,795,881	A	6/1957	Bellows	3,748,950	A	7/1973	Huntington
2,813,376	A	11/1957	Middlemark	3,764,219	A	10/1973	Collins
2,817,233	A	12/1957	Dower et al.	3,769,758	A	11/1973	McDonald
2,821,117	A	1/1958	Hultgren	3,771,176	A	11/1973	Herman
2,847,909	A	8/1958	Kester	3,804,238	A	4/1974	Howard
2,867,931	A	1/1959	Schreiber	3,813,816	A	6/1974	Funk
2,874,707	A	2/1959	Koppel	3,815,270	A	6/1974	Pachmayr
2,877,689	A	3/1959	Pribis	3,826,559	A	7/1974	Berliner et al.
2,894,347	A	7/1959	Woodcock	3,827,172	A	8/1974	Howe
2,924,881	A	2/1960	Gee	3,842,527	A	10/1974	Low
2,924,904	A	2/1960	Amsler	D233,853	S	12/1974	Ferrara
2,924,914	A	2/1960	Garwood	3,876,078	A	4/1975	Gomes et al.
2,975,540	A	3/1961	Lewis	3,877,178	A	4/1975	Campanelli
2,999,788	A	9/1961	Morgan	3,878,939	A	4/1975	Wilcox
3,011,283	A	12/1961	Lunn et al.	3,885,357	A	5/1975	Hoyt
3,012,350	A	12/1961	Wold	3,893,266	A	7/1975	Anderson et al.
3,013,289	A	12/1961	Sasena	3,895,803	A	7/1975	Loe
3,023,527	A	3/1962	Leek et al.	3,899,175	A	8/1975	Loe
3,024,653	A	3/1962	Broadway	3,899,797	A	8/1975	Gunst
3,041,938	A	7/1962	Seabrook	D237,106	S	10/1975	Baljet et al.
3,055,655	A	9/1962	Chelf	3,913,746	A	10/1975	Burton
3,060,612	A	10/1962	Brown et al.	3,914,879	A	10/1975	Taylor, III et al.
3,107,642	A	10/1963	Lakin	3,935,657	A	2/1976	Wade
3,112,567	A	12/1963	Flanagan	3,947,988	A	4/1976	Besaw
3,125,929	A	3/1964	Peasley	3,949,987	A	4/1976	Candor
3,128,668	A	4/1964	Dicken	3,961,436	A	6/1976	Hagen et al.
3,137,957	A	6/1964	Ingalls	3,964,613	A	6/1976	Anderson, Jr.
				3,979,849	A	9/1976	Haskins

US 8,464,628 B2

Page 3

4,007,554 A	2/1977	Helmstadter	4,732,394 A	3/1988	Stein et al.
4,012,860 A	3/1977	Auger	4,736,843 A	4/1988	Leonard
4,021,971 A	5/1977	McFadden	4,739,996 A	4/1988	Vedder
4,026,057 A	5/1977	Cady	4,751,963 A	6/1988	Bui et al.
4,027,781 A	6/1977	Covert	D297,855 S	9/1988	Ruger et al.
4,042,242 A	8/1977	Nicholls et al.	4,776,471 A	10/1988	Elkins
4,054,288 A	10/1977	Perrine, Sr.	4,790,079 A	12/1988	Meyers
4,055,016 A	10/1977	Katsenes	4,790,096 A	12/1988	Gibson et al.
4,072,313 A	2/1978	Murso et al.	4,799,324 A	1/1989	Nodo
4,076,247 A	2/1978	Kim et al.	4,807,381 A	2/1989	Southard
4,090,606 A	5/1978	Dawson	4,807,888 A	2/1989	Pidde et al.
4,120,108 A	10/1978	Vickers et al.	4,815,593 A	3/1989	Brown
4,120,276 A	10/1978	Curran	4,819,359 A	4/1989	Bassett
4,122,623 A	10/1978	Stice	4,821,422 A	4/1989	Porter
4,143,491 A	3/1979	Blanc	4,821,443 A	4/1989	Bianco
4,177,608 A	12/1979	Balz	4,823,673 A	4/1989	Downing
4,188,855 A	2/1980	Alberts	4,824,086 A	4/1989	Rickling et al.
4,203,600 A	5/1980	Brown	4,841,839 A	6/1989	Stuart
4,206,573 A	6/1980	Hayward	4,850,151 A	7/1989	Ditscherlein
4,222,305 A	9/1980	Lee	4,854,066 A	8/1989	Canterbury, Sr.
4,223,588 A	9/1980	Simpson	4,862,567 A	9/1989	Beebe
4,233,748 A	11/1980	Ford et al.	D304,223 S	10/1989	Ruger et al.
D257,687 S	12/1980	Bechtel	4,873,777 A	10/1989	Southard
4,266,748 A	5/1981	Dalton	4,890,406 A	1/1990	French
4,266,780 A	5/1981	McQuary	4,890,847 A	1/1990	Cartee et al.
4,282,671 A	8/1981	Wood et al.	4,896,446 A	1/1990	Gregory
D260,650 S	9/1981	Alviti	D306,234 S	2/1990	Ferstl
D261,794 S	11/1981	Bechtel	4,903,425 A	2/1990	Harris
4,301,625 A	11/1981	Rampe	4,910,904 A	3/1990	Rose
4,312,146 A	1/1982	Koon, Jr.	4,918,825 A	4/1990	Lesh et al.
4,332,185 A	6/1982	Hargrove	4,921,256 A	5/1990	Gearhart
4,333,385 A	6/1982	Culver	4,923,402 A	5/1990	Marshall et al.
4,338,726 A	7/1982	Swales	4,924,616 A	5/1990	Bell et al.
4,340,370 A	7/1982	Marshall et al.	4,937,965 A	7/1990	Narvaez
4,345,398 A	8/1982	Pickett	D310,302 S	9/1990	Southard
4,346,530 A	8/1982	Stewart et al.	4,967,497 A	11/1990	Yakscoe
4,359,833 A	11/1982	Pachmayr et al.	4,971,208 A	11/1990	Reinfried, Jr. et al.
4,361,989 A	12/1982	Ohno	4,972,619 A	11/1990	Eckert
4,385,464 A	5/1983	Casull	4,979,752 A	12/1990	Fosseen
4,385,545 A	5/1983	Duer	D313,886 S	1/1991	Southard
4,391,058 A	7/1983	Casull	4,987,694 A	1/1991	Lombardo
4,392,321 A	7/1983	Bosworth	4,998,367 A	3/1991	Leibowitz
4,407,379 A	10/1983	Pryor et al.	4,998,944 A	3/1991	Lund
4,409,751 A	10/1983	Goda et al.	5,005,657 A	4/1991	Ellion et al.
4,409,826 A	10/1983	Wenger	5,009,021 A	4/1991	Nelson
4,426,085 A	1/1984	Dixon	5,014,793 A	5/1991	Germanton et al.
4,438,913 A	3/1984	Hylla	5,031,348 A	7/1991	Carey
4,449,314 A	5/1984	Sorensen	5,050,330 A	9/1991	Pilgrim et al.
4,462,598 A	7/1984	Chalin et al.	5,058,302 A	10/1991	Minneman
4,477,082 A	10/1984	McKenzie et al.	5,060,410 A	10/1991	Mueller
4,480,411 A	11/1984	Balz et al.	5,063,679 A	11/1991	Schwandt
4,506,466 A	3/1985	Hall	5,067,268 A	11/1991	Ransom
4,508,508 A	4/1985	Theodore	5,070,636 A	12/1991	Mueller
4,512,101 A	4/1985	Waterman, Jr.	5,074,188 A	12/1991	Harris
4,522,102 A	6/1985	Pickens	5,081,783 A	1/1992	Jarvis
4,526,084 A	7/1985	David et al.	5,117,850 A	6/1992	Money
4,540,182 A	9/1985	Clement	5,123,194 A	6/1992	Mason
4,542,677 A	9/1985	Lee	5,125,389 A	6/1992	Paff
4,548,392 A	10/1985	Rickling	5,143,340 A	9/1992	Wood et al.
4,558,531 A	12/1985	Kilby	5,149,900 A	9/1992	Buck
D283,561 S	4/1986	Geist	5,173,563 A	12/1992	Gray
4,601,124 A	7/1986	Brown, Jr.	5,180,874 A	1/1993	Troncoco
4,608,762 A	9/1986	Varner	5,185,927 A	2/1993	Rivers
4,621,563 A	11/1986	Poiencot	5,186,468 A	2/1993	Davies
4,625,620 A	12/1986	Harris	5,188,371 A	2/1993	Edwards
4,632,008 A	12/1986	Horner	5,194,678 A	3/1993	Kramer
4,644,987 A	2/1987	Kiang et al.	D335,896 S	5/1993	Evenson
4,648,191 A	3/1987	Goff et al.	5,211,404 A	5/1993	Grant
4,653,210 A	3/1987	Poff, Jr.	5,221,806 A	6/1993	Chaney et al.
4,671,364 A	6/1987	Fink et al.	5,222,306 A	6/1993	Neumann
4,674,216 A	6/1987	Ruger et al.	5,228,887 A	7/1993	Mayer et al.
4,695,060 A	9/1987	Pilgrim	5,232,227 A	8/1993	Bateman
4,696,356 A	9/1987	Ellion et al.	5,233,779 A	8/1993	Shaw
4,702,029 A	10/1987	DeVaul et al.	5,235,764 A	8/1993	Perazzi et al.
4,715,499 A	12/1987	Howard	5,237,778 A	8/1993	Baer
4,716,673 A	1/1988	Williams et al.	5,247,758 A	9/1993	Mason
4,721,205 A	1/1988	Burt et al.	5,271,175 A	12/1993	West, III
4,723,472 A	2/1988	Lee	5,275,890 A	1/1994	Wolf et al.
4,729,186 A	3/1988	Rieger et al.	5,287,643 A	2/1994	Arizpe-Gilmore

US 8,464,628 B2

5,311,693 A	5/1994	Underwood	5,758,447 A	6/1998	Venetz
5,315,781 A	5/1994	Beisner	5,758,933 A	6/1998	Clendening
5,316,579 A	5/1994	McMillan et al.	5,761,954 A	6/1998	Dvorak
5,317,826 A	6/1994	Underwood	5,778,589 A	7/1998	Teague
5,320,217 A	6/1994	Lenarz	5,779,527 A	7/1998	Maebashi
5,320,223 A	6/1994	Allen	5,811,720 A	9/1998	Quinnell et al.
5,328,029 A	7/1994	Chow et al.	5,813,131 A	9/1998	Werre
5,332,185 A	7/1994	Walker, III	5,815,974 A	10/1998	Keng
5,333,829 A	8/1994	Bell et al.	5,833,308 A	11/1998	Strong, III et al.
5,335,578 A	8/1994	Lorden et al.	D403,176 S	12/1998	Harper
5,337,505 A	8/1994	Brown et al.	5,845,774 A	12/1998	Hausknecht
5,344,012 A	9/1994	Matthews	5,857,279 A	1/1999	de Oliveira Masina et al.
5,347,740 A	9/1994	Rather et al.	5,875,580 A	3/1999	Hill et al.
5,351,428 A	10/1994	Graham	5,878,504 A	3/1999	Harms
5,358,254 A	10/1994	Yeh et al.	5,884,966 A	3/1999	Hill et al.
5,361,505 A	11/1994	Faughn	5,899,329 A	5/1999	Hu et al.
5,367,232 A	11/1994	Netherton et al.	5,907,919 A	6/1999	Keeney
5,370,240 A	12/1994	Hand	5,913,422 A	6/1999	Cote
5,375,337 A	12/1994	Butler	5,913,667 A	6/1999	Smilee
5,375,377 A	12/1994	Kenton	5,913,668 A	6/1999	Messer
5,377,437 A	1/1995	Underwood	5,924,694 A	7/1999	Kent
5,392,553 A	2/1995	Carey	5,930,932 A	8/1999	Peterson
5,394,983 A	3/1995	Latulippe et al.	5,933,997 A	8/1999	Barrett
5,402,595 A	4/1995	Tamillos	5,933,999 A	8/1999	McClure et al.
5,406,733 A	4/1995	Tarlton et al.	5,959,613 A	9/1999	Rosenberg et al.
5,410,833 A	5/1995	Paterson	5,970,642 A	10/1999	Martin
5,414,949 A	5/1995	Peebles	5,974,719 A	11/1999	Simonek
D359,392 S	6/1995	Bellington	6,019,375 A	2/2000	West, Jr.
5,421,115 A	6/1995	McKay	6,021,891 A	2/2000	Anderson
5,433,010 A	7/1995	Bell	6,032,796 A	3/2000	Hopper
5,433,451 A	7/1995	De Vries	6,042,080 A	3/2000	Shepherd et al.
5,435,223 A	7/1995	Blodgett et al.	6,044,747 A	4/2000	Felts
5,442,860 A	8/1995	Palmer	6,058,641 A	5/2000	Vecqueray
D362,116 S	9/1995	Bellington et al.	6,073,381 A	6/2000	Farrar et al.
5,446,987 A	9/1995	Lee et al.	6,086,375 A	7/2000	Legros
D364,080 S	11/1995	Weyrauch	6,092,662 A	7/2000	Frederick, Jr.
5,481,817 A	1/1996	Parker	6,110,020 A	8/2000	Rolfi
5,482,241 A	1/1996	Oglesby	6,121,556 A	9/2000	Cole
5,486,135 A	1/1996	Arpaio	6,237,462 B1	5/2001	Hawkes et al.
5,490,302 A	2/1996	Dion	6,254,100 B1	7/2001	Rinehart
5,491,921 A	2/1996	Allen	6,260,463 B1	7/2001	Brand et al.
5,497,557 A	3/1996	Martinsson et al.	6,269,578 B1	8/2001	Callegari
5,497,575 A	3/1996	Fried et al.	6,283,428 B1	9/2001	Maples et al.
5,501,467 A	3/1996	Kandel	6,289,622 B1	9/2001	Desch, Jr. et al.
D369,904 S	5/1996	Taylor	6,293,041 B2	9/2001	Weaver
5,525,314 A	6/1996	Hurson	6,294,759 B1	9/2001	Dunn, Jr.
5,540,329 A	7/1996	Vogeley	6,305,117 B1	10/2001	Hales, Sr.
5,545,855 A	8/1996	Stanfield et al.	6,309,476 B1	10/2001	Ravenscroft et al.
5,562,208 A	10/1996	Hasler et al.	6,338,218 B1	1/2002	Hegler
D375,538 S	11/1996	Minneman	6,390,294 B1	5/2002	Fiore, Jr. et al.
5,570,513 A	11/1996	Peterson	6,397,720 B1	6/2002	Fox et al.
5,580,063 A	12/1996	Edwards	6,439,515 B1	8/2002	Powers
5,588,242 A	12/1996	Hughes	6,439,530 B1	8/2002	Schoenfish et al.
5,600,913 A	2/1997	Minneman	6,517,133 B2	2/2003	Seegmiller et al.
5,617,666 A	4/1997	Scott	D471,248 S	3/2003	Jacobs
5,622,344 A	4/1997	Gracie	6,526,687 B1	3/2003	Looney
5,628,135 A	5/1997	Cady	D473,376 S	4/2003	Abate
D380,116 S	6/1997	Minneman	6,546,662 B1	4/2003	Chong
5,640,944 A	6/1997	Minneman	6,557,855 B2	5/2003	Wu
5,644,862 A	7/1997	Folmer	6,574,899 B1	6/2003	Mostello
5,649,465 A	7/1997	Beebe	6,575,469 B2	6/2003	Love
5,651,207 A	7/1997	Knight	6,643,973 B1	11/2003	Smith
5,653,625 A	8/1997	Pierce et al.	6,663,298 B2	12/2003	Haney
5,661,919 A	9/1997	Pryor	6,688,031 B2	2/2004	Steele
5,662,516 A	9/1997	You	6,733,375 B2	5/2004	Hoffman
5,666,757 A	9/1997	Helmstadter	6,736,400 B1	5/2004	Cesternino
D387,123 S	12/1997	Hughes et al.	6,813,855 B2	11/2004	Pinkley
5,703,317 A	12/1997	Levilly et al.	6,814,654 B2	11/2004	Rolfi
5,704,482 A	1/1998	Apps et al.	6,854,975 B2	2/2005	Ranzinger
5,711,102 A	1/1998	Plaster et al.	6,860,054 B1	3/2005	Mosher
5,711,103 A	1/1998	Keng	6,862,833 B1	3/2005	Gurtner
5,715,625 A	2/1998	West, III	6,871,440 B2	3/2005	Highfill et al.
D391,616 S	3/1998	Plybon	6,877,266 B1	4/2005	Brownlee
5,723,183 A	3/1998	Williams et al.	6,883,263 B1	4/2005	Carrow
5,723,806 A	3/1998	Odom	6,931,777 B1	8/2005	Krien
5,725,096 A	3/1998	Winnard	6,953,114 B2	10/2005	Wang et al.
5,737,865 A	4/1998	Brandl et al.	D513,055 S	12/2005	Lahti
5,740,625 A	4/1998	Jenkins	6,978,569 B2	12/2005	Williamson, IV et al.
5,743,395 A	4/1998	Backer	D519,183 S	4/2006	Minneman

7,032,494	B2	4/2006	Wygant	2007/0029733	A1	2/2007	Anderson
D521,100	S	5/2006	Morrow	2007/0046760	A1	3/2007	Zara
7,062,979	B2	6/2006	Day et al.	2007/0051028	A1	3/2007	Stordal
D524,541	S	7/2006	Cauley	2007/0068379	A1	3/2007	Sween et al.
7,086,192	B2	8/2006	Deros	2007/0068835	A1	3/2007	Buie, II
7,104,398	B1	9/2006	Wisecarver	2007/0074439	A2	4/2007	Cauley et al.
7,134,663	B1	11/2006	Lowe et al.	2007/0074440	A2	4/2007	Cauley
7,143,986	B1	12/2006	Austin et al.	2007/0094911	A1	5/2007	Rush et al.
7,152,355	B2	12/2006	Fitzpatrick et al.	2007/0113460	A1	5/2007	Potterfield et al.
7,152,358	B1	12/2006	LeAnna et al.	2007/0175077	A1	8/2007	Laney et al.
7,159,711	B1	1/2007	Gardner	2007/0256346	A1	11/2007	Potterfield et al.
7,165,750	B2	1/2007	McCuskey et al.	2007/0262529	A1	11/2007	Gamez et al.
7,188,445	B2	3/2007	Lehman	2007/0266610	A1	11/2007	Coffield
D540,904	S	4/2007	Werner	2007/0294929	A1	12/2007	Potterfield et al.
7,201,376	B2	4/2007	Kuosa	2007/0294930	A1	12/2007	Mays
7,207,567	B1	4/2007	Brown	2007/0295197	A1	12/2007	Potterfield
D543,604	S	5/2007	Minneman	2008/0023379	A1	1/2008	Potterfield et al.
7,213,494	B2	5/2007	James	2008/0034636	A1	2/2008	Potterfield et al.
7,225,050	B2	5/2007	Sutula, Jr.	2008/0041700	A1	2/2008	Potterfield et al.
D553,219	S	10/2007	Potterfield	2008/0047189	A1	2/2008	Potterfield et al.
7,281,346	B1	10/2007	Cook et al.	2008/0054570	A1	3/2008	Potterfield et al.
D567,895	S	4/2008	Cauley	2008/0061509	A1	3/2008	Potterfield
7,356,960	B1	4/2008	Knitt	2008/0127815	A1	6/2008	Yale et al.
7,356,961	B2	4/2008	Williams	2008/0128002	A1	6/2008	Jeffs
7,357,250	B2	4/2008	Hagemann et al.	2008/0156671	A1	7/2008	Jansson
7,363,740	B2	4/2008	Kincel	2008/0168697	A1	7/2008	Potterfield et al.
7,367,451	B2	5/2008	Pendergraph et al.	2008/0174071	A1	7/2008	Potterfield et al.
7,401,431	B2	7/2008	Pierce et al.	2008/0263928	A1	10/2008	Potterfield
7,410,053	B2	8/2008	Bowen et al.	2008/0295379	A1	12/2008	Potterfield et al.
D576,245	S	9/2008	Potterfield et al.	2009/0000175	A1	1/2009	Potterfield et al.
7,421,815	B1	9/2008	Moody et al.	2009/0020447	A1	1/2009	Potterfield et al.
7,426,800	B2	9/2008	Pierce et al.	2009/0049731	A1	2/2009	Seuk
7,431,247	B2 *	10/2008	Bobro 248/178.1	2009/0056192	A1	3/2009	Oz
7,536,820	B2	5/2009	Wade et al.	2009/0064559	A1	3/2009	Potterfield et al.
7,549,247	B1	6/2009	Reese	2009/0126250	A1	5/2009	Keng
7,584,690	B2	9/2009	Cauley	2010/0032905	A1	2/2010	Morrow et al.
D605,246	S	12/2009	Hobbs	2010/0102178	A1	4/2010	Smith et al.
7,631,455	B2	12/2009	Keng et al.	2010/0116163	A1	5/2010	Zara
7,654,498	B1	2/2010	Beltz	2010/0126055	A1	5/2010	Potterfield et al.
7,665,241	B2	2/2010	Oz	2010/0138032	A1	6/2010	Potterfield
7,676,977	B1	3/2010	Cahill et al.	2010/0236125	A1	9/2010	Morrow et al.
7,681,886	B2	3/2010	Morrow et al.	2010/0270201	A1	10/2010	Cauley et al.
7,694,973	B1	4/2010	Hofmeister et al.	2011/0024985	A1	2/2011	Potterfield
7,726,478	B2	6/2010	Potterfield et al.	2011/0036214	A1	2/2011	Potterfield
7,730,824	B1	6/2010	Black	2011/0036236	A1	2/2011	Potterfield et al.
7,774,972	B2	8/2010	Potterfield et al.	2011/0079524	A1	4/2011	Potterfield
7,779,572	B2 *	8/2010	Potterfield et al. 42/94	2011/0079542	A1	4/2011	Ellis et al.
7,845,267	B2	12/2010	Potterfield et al.	2011/0167705	A1	7/2011	Cauley et al.
7,946,071	B2	5/2011	Cauley	2011/0192069	A1	8/2011	Potterfield et al.
7,954,272	B2	6/2011	Potterfield et al.	2011/0225788	A1	9/2011	Potterfield
7,997,021	B2	8/2011	Cauley et al.	2012/0011760	A1	1/2012	Cauley
8,011,129	B2	9/2011	Cauley	2012/0085012	A1	4/2012	Potterfield et al.
2002/0113372	A1	8/2002	Love	2012/0144647	A1	6/2012	Cauley et al.
2002/0195752	A1	12/2002	Yang	2012/0174461	A1	7/2012	Potterfield et al.
2003/0079395	A1	5/2003	Chong	2012/0175844	A1	7/2012	Potterfield et al.
2003/0177685	A1	9/2003	Pinkley				
2003/0234205	A1	12/2003	McGuyer				
2004/0020097	A1	2/2004	Deros				
2004/0112777	A1	6/2004	Huang				
2004/0134113	A1	7/2004	Deros et al.				
2005/0000141	A1	1/2005	Cauley et al.				
2005/0011101	A1	1/2005	Gooder				
2005/0115137	A1	6/2005	Minneman				
2005/0178039	A1	8/2005	Flores				
2005/0183319	A1	8/2005	Franks				
2005/0188597	A1	9/2005	Keng et al.				
2005/0242250	A1	11/2005	Keng et al.				
2006/0063653	A1	3/2006	Wickens et al.				
2006/0070900	A1	4/2006	Brunson				
2006/0163534	A1	7/2006	Sugimoto et al.				
2006/0174532	A1	8/2006	Popikow				
2006/0175213	A1	8/2006	Hurt et al.				
2006/0218840	A1	10/2006	Cauley				
2006/0236584	A1	10/2006	Williams				
2006/0248774	A1	11/2006	Pierce et al.				
2006/0248775	A1	11/2006	Wade et al.				
2006/0254111	A1	11/2006	Giauque et al.				
2006/0277811	A1	12/2006	Peterson				
2006/0278797	A1	12/2006	Keng et al.				

OTHER PUBLICATIONS

U.S. Appl. No. 11/937,466, filed Nov. 8, 2007, Potterfield et al.
U.S. Appl. No. 12/172,848, filed Jul. 14, 2008, Cesternino et al.
“American Rifleman: What to do about recoil,” LookSmart, http://www.findarticles.com/p/articles/mi_qa3623/is_199907/ai_n8861959/print, pp. 1-4 [Internet accessed on Jan. 4, 2006].
“Cabela’s Rotary Media Separator,” <http://www.cabelas/en/templates/links/link.jsp;jsessionid=QYVQMKM0P0P5...>, 2 pages [Internet accessed Apr. 24, 2007].
“Cleaning Cradles: Sinclair Cleaning Cradles” p. 21, The date on which the Sinclair Folding Cleaning Cradle was first on sale is not known, but is believed to be circa 2004.
“Decker Rifle Vise,” 1 page. The date on which the Decker Rifle Vise was first on sale is not known but is believed to be circa 2004.
“Eforcity Magnetic Screwdriver Set w/15 bits Great for Cellphones, Computers Includes: T6, Torx, Security Torx, Philips, Slotted, Spanner, Tri-Wing, Bent Pry Tool, Round Awl, Reset Pin for Game Boy Advance, Nintendo Wii, DS lite, NDS, Apple TV”, Amazon.com, accessed on Sep. 18, 2007.
“Gun Rest—Shooting Rest—Rifle Rests,” <http://www.jexploreproducts.com/gunrests-shootingrests.htm>, 6 pages [Internet accessed Jul. 18, 2008].

- “Plano Shooters Case, Brown Camo,” The Sportsman’s Guide, <http://www.sportmansguide.com/cb/cb.asp?a=148225>, the date on which the Plano Shooters Case was first on sale is not known but is believed to be circa 2004, 3 pages [Internet accessed No. Oct. 11, 2006].
- “Reloading Manual Number Ten for Rifle and Pistol,” The Cartridge Components, SPEER Omark Industries, pp. 28-54.
- “Shotshell reloading with a GRABBER,” MEC—Mayville Engineering Company, Inc., pp. 1-12.
- “The Grabber and Hustler ’76,” MEC—Mayville Engineering Company, Inc., 2 pgs, date unknown.
- “Uncle Bud’s Bull Bags,” <http://www.unclebudscss.com/pages/Bulls%20bags.html>, 2 pgs. [Internet accessed on Feb. 14, 2006].
- “Uncle Bud’s Udder Bag,” <http://www.unclebudscss.com/pages/Udder%20Bags.html>, 2 pgs. [Internet accessed on Feb. 14, 2006].
- AcuSport, Outdoor Sporting Products, 3 pgs., undated.
- Amazon.com, “CTK® P3 Ultimate Shooting Rest,” Sports & Outdoors, <http://www.amazon.com/CTK%C2%AE-P3-Ultimate-Shooting-Rest/dp/> . . . , 1 page [Internet accessed on Jul. 22, 2008].
- Amazon.com, “SHTRS RDG Steady PNT Rifle Rest DLX, Grips/Pads/Stocks, Gun Accessories, Hunting & Shooting Accessories, Hunting Gear, Fishing & Hunting,” <http://www.amazon.com/STEADY-Accessories-Hunting-Shooting-Fishin> . . . , 1 page [Internet accessed on Jul. 22, 2008].
- Amazon.com, “Stoney Point Adjustable Shooting Rest w/Bag,” Sports & Outdoors, <http://www.amazon.com/Stoney-Point-Adjustable-Shooting-Rest/dp/B0..>, 1 page [Internet accessed on Jul. 22, 2008].
- Basspro.com, “Bass Pro Shops Outdoors Online: Offering the best in Fishing, Hunting and Outdoor Products,” http://www.basspro.com/webapp/wcs/stores/servlet/Product_10151_-_1_10001_95064_SearchResults, 2 pages [Internet accessed on Aug. 6, 2008].
- Battenfeld Technologies, Inc., “Steady Rest Portable Shooting Rest,” 1 page [Internet accessed Jan. 25, 2006].
- Big Boy Gun Toys, “Shooting Rest,” <http://www.bigboyguntoys.com/shootingrest.htm>, 1 page [Internet accessed on Jul. 18, 2008].
- Birchwood Casey 2005 Catalog, 28 pages.
- Birchwood Casey 2006 Catalog. The date of availability of this catalog is unknown, but is believed to be in Jan. 2006 or later. pp. 5-17 (color copy attached).
- Birchwood Casey, “Dirty Bird@Splattering Targets,” http://www.birchwoodcasey.com/sport/target_index.asp?categoryID=4&subcat=22, pp. 1-4, internet accessed Jan. 16, 2006.
- Birchwood Casey, “Shoot•N•C® Targets,” http://www.birchwoodcasey.com/sport/target_index.asp?categoryID=4&subcat=8, pp. 1-8, internet accessed Jan. 16, 2006.
- Birchwood Casey, “Targets Spots®,” http://www.birchwoodcasey.com/sport_index.asp?categoryID=4&subcat=12, pp. 1-2, internet accessed Jan. 16, 2006.
- Birchwood Casey, “World of Targets®” http://www.birchwoodcasey.com/sport/target_index.asp?categoryID=4&subcat=13, pp. 1-4, internet accessed Jan. 16, 2006.
- Boyt Harness Company, Product Catalog, <http://www.boytharness.com/catalog/index.php?cPath=22> 2 pages [Internet accessed on Jul. 21, 2008].
- Brass Cleaning Kits, <http://www.berrysmfg.com/81.php>, 1 page [Internet accessed Apr. 24, 2007].
- Brownells Inc., Brownells Magna-Tip Screwdriver, Brownells Catalog No. 54 for 2001-2002, 2001, p. 151.
- Brownells Inc., Brownells Magna-Tip Super-Sets, Brownells Catalog No. 54 for 2001-2002, 2001, p. 153.
- Brownells Inc., Catalog No. 41 1988-1989 3 pages (8909).
- Brownells Inc., Catalog No. 47 1994-1995 2 pages (8909).
- Brownells Inc., Catalog No. 57. For 2004-2005. 2 pages.
- Brownells Inc., Sight Base Cutters, Faxed Dec. 17, 2003, 1 page.
- B-Square, Pro Gunsmith Screwdriver Set, B-Square Mounts Tools Accessories Product Catalog, p. 23, date unknown.
- Cabela’s “Master Catalog Fall 2003: Late-Season Edition” Cover page and p. 416. 2 pages.
- Cabela’s, “BenchBuddy® Gun Rest,” <http://www.cabelas.com/cabelas/en/templates/links/link.jsp?id=0005819221954a&type=product&cmCat=>, © 1996-2008, 2 pages [Internet accessed on Aug. 6, 2008].
- Cabela’s, “Elite Rifle Rest,” <http://www.cabelas.com/cabelas/en/templates/links/link.jsp?id=0005817227855a&type=product&cmCat=>, © 1996-2008, 2 pages [Internet accessed on Aug. 6, 2008].
- Cabela’s, “Hyskore® Dangerous Game™ Machine Rest,” <http://www.cabelas.com/cabelas/en/templates/links/link.jsp?id=0044091228566a&type=product&cmCat=>, © 1996-2008, 2 pages [Internet accessed on Aug. 6, 2008].
- Cabela’s, “Hyskore® Ultimate Sighting Rest,” <http://www.cabelas.com/cabelas/en/templates/links/link.jsp?id=0024152226083a&type=product&cmCat=>, © 1996-2008, 2 pages [Internet accessed on Aug. 6, 2008].
- Cabela’s, “Nitro Shoulder Shield Rest,” <http://www.cabelas.com/cabelas/en/templates/links/link.jsp?id=0040862228231a&type=product&cmCat=>, © 1996-2008, 2 pages [Internet accessed on Aug. 6, 2008].
- Cabela’s, “Premier Rifle Rest,” <http://www.cabelas.com/cabelas/en/templates/links/link.jsp?id=0020904227856a&type=product&cmCat=> . . . , © 1996-2008, 2 pages [Internet accessed on Aug. 6, 2008].
- Cabela’s, “Secure Bench Rest,” <http://www.cabelas.com/cabelas/en/templates/links/link.jsp;jsessionid=4F0LP0OW2HMRLLAQBBISCOF..>, © 1996-2008, 2 pages [Internet accessed on Aug. 6, 2008].
- Cabela’s, “Sharp Shooter Auto Magnum Rifle Rest,” <http://www.cabelas.com/cabelas/en/templates/links/link.jsp?id=0054107229088a&type=product&cmCat=>, © 1996-2008, 2 pages [Internet accessed on Aug. 6, 2008].
- Cabela’s, “Sharp Shooter Rifle Rest,” <http://www.cabelas.com/cabelas/en/templates/links/link.jsp?id=0005816222738a&type=product&cmCat=>, © 1996-2008, 2 pages [Internet accessed on Aug. 6, 2008].
- Cabela’s, “Shooting Benches & Portable Rifle Shooting Bench Rest,” <http://www.cabelas.com/ssubcat-1/cat20793.shtml>, 3 pages [Internet accessed Jul. 18, 2008].
- Cabela’s, “Sure Shot Shooting Vise/Rest,” <http://www.cabelas.com/cabelas/en/templates/product/standard-item.jsp?id=00348272277> . . . , © 1996-2008, 2 pages [Internet accessed on Jul. 15, 2008].
- Cabela’s, “HySkore Sighting System and Cleaning Vise,” the date on which the HySkore Sighting System and Cleaning Vise was first on sale is not known, but is believed to be circa Jan. 2005. However, a prototype of this product may have been shown to buyers at Cabela’s circa Aug. 2004, 1 page.
- Caldwell Insta-View™ 4" Targets.
- Caldwell Shooting Supplies, 2006 Catalog, pp. 18, 5, 12, 14 and 15.
- Caldwell Shooting Supplies, Targets & Target Accessories, Insta-View™ Targets, 1 page.
- Caldwells Insta-View 4" Targets, 1 page [product photo].
- Californiavarmintcallers.com—Forum, http://californiavarmintcallers.com/community/modules/newbb/viewtopic.php?topic_id=10&forum=9&PHPSESSID=074ed8c7 . . . , pp. 1-4, accessed Jan. 16, 2006.
- Canadian Camo, “Gun Rest,” http://media5.magma.ca/www.canadiancamo.com/catalog/product_info.php?products_id= . . . , 2 pages [Internet accessed on Feb. 13, 2006].
- Carmichael, J., “Reloading for Accuracy,” Lyman Reloading Handbook, 46th Edition, pp. 68-77.
- Champion Targets, “Next Generation Paper Targets,” http://www.championtarget.com/products/targets/next_generation_targets.aspx, pp. 1-3, [internet accessed Jan. 16, 2006].
- Champion Traps & Target, 2005 Product Catalog, 12 pages.
- Chastain, R., “Load ’em Up!” About.com: Hunting/ Shooting, http://hunting.about.com/od/reloadinginfo/a/aaloademup_2htm, 6 pages [Internet accessed on Aug. 31, 2007].
- Cork Industries, Inc., “Double Bumping Coating Applications,” Cork Tech TalkNews, Feb. 1997, 2 pages.
- CTK Precision, “P3 Ultimate Shooting Rest,” <http://www.cktprecision.com/index.asp?PageAction=VIEWPROD&ProdOID=2>, 3 pages [Internet accessed on Jul. 18, 2008].
- CTK Precision, All Products, <http://www.cktprecision.com/index.asp?PageAction=VIEWCATS&Cate..>, 3 pages [Internet accessed on Jul. 22, 2008].
- CV-500, 3 pages [product photos].

- Device manufactured by Shooter's Ridge, a division of ATK, and available at least by late 2005, 1 page.
- Dillon Precision CV-500 Cartridge Case Vibratory Cleaner, 6 pages [product photos].
- E. Arthur Brown Company, "A Shooting Rest that Really Works...", <http://www.eabco.com/TargetShooting01.html>, © 2007-2008, 1 page [Internet accessed Jul. 18, 2008].
- Edgewood Shooting Bags Catalog, <http://www.edgebag.com/catalog.php>, 7 pages [Internet accessed on Feb. 14, 2006].
- Ellett Brothers, Rests & Gun Vises, pp. 621-622, date unknown.
- Final Office Action; U.S. Appl. No. 10/865,595; Mailed on Apr. 3, 2007, 10 pages.
- Final Office Action; U.S. Appl. No. 11/206,430; Mailed on Oct. 29, 2007, 13 pages.
- Final Office Action; U.S. Appl. No. 11/206,430; Mailed on Nov. 24, 2008, 12 pages.
- Final Office Action; U.S. Appl. No. 11/206,430; Mailed on Apr. 1, 2010, 14 pages.
- Final Office Action; U.S. Appl. No. 11/271,100; Mailed on Sep. 22, 2008, 8 pages.
- Final Office Action; U.S. Appl. No. 11/339,863; Mailed on Mar. 10, 2009, 6 pages.
- Final Office Action; U.S. Appl. No. 11/431,956; Mailed on Nov. 27, 2009, 13 pages.
- Final Office Action; U.S. Appl. No. 11/505,784; Mailed on Dec. 19, 2008, 10 pages.
- Final Office Action; U.S. Appl. No. 11/507,683; Mailed on Apr. 6, 2010, 7 pages.
- Final Office Action; U.S. Appl. No. 11/607,550; Mailed on Nov. 27, 2009, 14 pages.
- Final Office Action; U.S. Appl. No. 11/679,100; Mailed on Aug. 3, 2009, 9 pages.
- Final Office Action; U.S. Appl. No. 11/679,136; Mailed on Apr. 10, 2009, 22 pages.
- Final Office Action; U.S. Appl. No. 11/679,832; Mailed on Jun. 8, 2010, 12 pages.
- Final Office Action; U.S. Appl. No. 11/801,341; Mailed on Sep. 30, 2009, 6 pages.
- Final Office Action; U.S. Appl. No. 11/844,980; Mailed on May 25, 2010, 6 pages.
- Final Office Action; U.S. Appl. No. 11/853,763; Mailed on Jul. 13, 2009, 7 pages.
- Final Office Action; U.S. Appl. No. 12/476,041; Mailed on Jul. 20, 2010, 7 pages.
- Final Office Action; U.S. Appl. No. 12/177,032; Mailed on Oct. 5, 2010, 11 pages.
- Grafix Plastics, http://grafixplastic.com/plastic_film_g.asp?gclid=CK-5-7gnY4CFRVNhgodjFhfSQ, 29 pages [Internet accessed on Aug. 30, 2007].
- Harris, J. et al., "The Art and Science of Annealing," <http://www.6mmb.com/annealing.html>, © 2005, 13 pages [Internet accessed on Aug. 13, 2007].
- Hyskore, "Rest—Dangerous Game Machine Rest," Hyskore Rest, Professional firearm rests, <http://www.hyskore.com/rests.htm>, 2 pages [Internet accessed Jul. 21, 2008].
- Hyskore: Professional Shooting Accessories. "Dangerous Game Machine Rest," Accessed Feb. 22, 2006 www.hyskore.com, 10 pages.
- Hyskore: Professional Shooting Accessories. "Hydraulic Trigger Release." Accessed Feb. 22, 2006. www.hyskore.com 7 pages.
- International Search Report and Written Opinion; International Patent Application No. PCT/US07/76440; Filed: Aug. 21, 2007; Applicant: Battenfeld Technologies, Inc.; Mailed on Sep. 30, 2008.
- International Search Report and Written Opinion; International Patent Application No. PCT/US07/76587; Filed: Aug. 22, 2007; Applicant: Battenfeld Technologies, Inc.; Mailed on Jul. 30, 2008.
- International Search Report and Written Opinion; International Patent Application No. PCT/US07/83674; Filed: Nov. 5, 2007; Applicant: Battenfeld Technologies, Inc.; Mailed on Jun. 11, 2008.
- Joe's, "Shooter's Ridge Steady Point Shooting Rest," <http://www.joessport.com/product/index.jsp?productID=3155005&cp=726872&parentpag..>, Item No. 3155005, 1 page [Internet accessed Jul. 17, 2008].
- Lahti Company Brochure, "Rock Solid Hold," Rifle Evaluator, <http://www.lathicompany.com/Forms/EvaluatorBrochure2.jpg>, 2 pages. [Internet accessed Jan. 16, 2006].
- Lahti Company Brochure, "Rifle Evaluator: No Pain, No Fear, No Flinching, No Body Movement," www.lathicompany.com, 2 pages, undated.
- Lee Precision, Inc., "Load-All," 1 page.
- Lee Precision, Inc., "The World's Fastest Handloading Press . . . Lee Progressive 1000," 1985 Catalog, pp. 1-15.
- Lohman Sight Vise, 4 pages product photographs, the date on which the Lohman Site Vise was first on sale is not known, but is believed to be circa 2004.
- Lyman Hornady Case Tumbler, 2 pages [product photos].
- Lyman Turbo 600 Tumbler, 3 pages [product photos].
- Lyman Turbo Pro 1200 Tumber, 2 pages [product photos].
- Lyman, "A History of Lyman Metallic Reloading," Reloading Handbook, 46th Edition, pp. 10-31.
- Lyman, "Introduction to Reloading," Reloading Handbook, 46th Edition, pp. 170-203.
- MacksPW.com, "Desert Mountain Bench Master Rifle Rest," <http://www.macksqw.com/Item—i-DESBM1>, © 2004-2008, 1 page [Internet accessed Jul. 22, 2008].
- Midway USA, Chapman 27-Piece Deluxe Screwdriver Set, Master Catalog and Reference Guide #2, 2004, p. 440.
- Midway USA, Pachmayr Professional Screwdriver Set, Master Catalog and Reference Guide #2, 2004, p. 448.
- Midway USA, Wheeler Engineering Space-Saver Gunsmithing Screwdriver Set, Master Catlog and Reference Guide #2, 2004, p. 453.
- Midway USA. "Tipton Range Box with Ultimate Rifle, Handgun Cleaning Kit (No Solvents)," <http://www.midwayusa.com/rewriteaproduct/135086>, The date on which the Tipton Range Box was first on sale is not known, but is believed to be circa 2004, 2 pages.
- MidwayUSA, "ADG Rifle Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=992071&t=11082005>, 2005, 3 pages [Internet accessed on Aug. 6, 2008].
- MidwayUSA, "Caldwell Full Length Fire Control Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=683866&t=11082005>, 2005, 3 pages [Internet accessed on Aug. 6, 2008].
- MidwayUSA, "Caldwell Lead Sled DFT Rifle Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=149023&t=11082005>, 2005, 6 pages [Internet accessed on Aug. 6, 2008].
- MidwayUSA, "Caldwell Lead Sled Rifle Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=152664&t=11082005>, 2005, 8 pages [Internet accessed on Aug. 6, 2008].
- MidwayUSA, "Caldwell Steady Rest NXT Rifle Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=838651&t=11082005>, 2005, 4 pages [Internet accessed on Aug. 6, 2008].
- MidwayUSA, "Caldwell Zero-Max Rifle Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=726222&t=11082005>, 2005, 3 pages [Internet accessed on Aug. 6, 2008].
- MidwayUSA, "CTK Precision P3 Ultimate Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=114699&t=11082005>, 2005, 2 pages [Internet accessed on Aug. 6, 2008].
- MidwayUSA, "Hyskore® dangerous Game Rifle Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=729197&t=11082005>, 2005, 3 pages [Internet accessed on Aug. 6, 2008].
- MidwayUSA, "Hyskore® Precision Gas Dampened Recoil Reducing Rifle Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=838848&t=11082005>, 2005, 4 pages [Internet accessed on Aug. 6, 2008].
- MidwayUSA, "Hyskore® Swivel Varmint Rifle Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=587606&t=11082005>, 2005, 3 pages [Internet accessed on Aug. 6, 2008].

- MidwayUSA, "Shooters Ridge Steady Point Rifle Shooting Rest and Vise," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=341095&t=11082005>, 2005, 4 pages [Internet accessed on Aug. 6, 2008].
- MidwayUSA, "Shooters Ridge Steady Point Rifle Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=826745&t=11082005>, 2005, 5 pages [Internet accessed on Aug. 6, 2008].
- MidwayUSA, "Shooting Supplies—Shop Everything for Your Firearm at MidwayUSA," <http://www.midwayusa.com/browse/BrowseProducts.aspx?categoryStrin...>, 15 pages [Internet accessed on Jul. 21, 2008].
- MidwayUSA, "Stoney Point Bench Anchor Rifle Shooting Rest," <http://www.midwayusa.com/eproductpage.exe/showproduct?saleitemid=347174&t=11082005>, 2005, 2 pages [Internet accessed on Aug. 6, 2008].
- Milek, B., "Handloading for Hunting" New Products from RCBS, Lee, Accurate Arms, Peterson's Hunting, Mar. 1985, p. 21.
- Millett, "BenchMaster Shooting Rests," 1 page, Undated.
- MTM Case-Gard, "Gun Maintenance Centers," <http://www.mtmcase-gard.com/products/shooting/gunm.html>, the date on which the MTM Gun Maintenance Center was first on sale is not known, but is believed to be circa 2004, 2 pages [Internet accessed Oct. 11, 2006].
- MTM Case-Gard, "MTM Shoulder-Gard Rifle Rest," Cover Photo for Rest, p. 2, date unknown.
- MTM Case-Gard, "Rifle rest and pistol shoot rest," <http://www.mtmcase-gard.com/products/shooting/shoo.html>, the date on which the MTM Site-In-Clean was first on sale is not known, but is believed to be circa 2004, 3 pages [Internet accessed on Oct. 11, 2006].
- Non-Final Office Action; U.S. Appl. No. 10/865,595; Mailed on Jun. 7, 2006, 8 pages.
- Non-Final Office Action; U.S. Appl. No. 11/206,430; Mailed on Jun. 23, 2009, 13 pages.
- Non-Final Office Action; U.S. Appl. No. 11/206,430; Mailed on May 14, 2008, 10 pages.
- Non-Final Office Action; U.S. Appl. No. 11/206,430; Mailed on May 21, 2007, 12 pages.
- Non-Final Office Action; U.S. Appl. No. 11/271,100; Mailed on Mar. 26, 2008, 9 pages.
- Non-Final Office Action; U.S. Appl. No. 11/311,530; Mailed on Feb. 13, 2007, 10 pages.
- Non-Final Office Action; U.S. Appl. No. 11/339,863; Mailed on Sep. 23, 2008, 7 pages.
- Non-Final Office Action; U.S. Appl. No. 11/418,407; Mailed on Feb. 24, 2009, 9 pages.
- Non-Final Office Action; U.S. Appl. No. 11/431,956; Mailed on Mar. 2, 2009, 16 pages.
- Non-Final Office Action; U.S. Appl. No. 11/505,784; Mailed on Dec. 26, 2007, 14 pages.
- Non-Final Office Action; U.S. Appl. No. 11/505,784; Mailed on Oct. 27, 2009, 8 pages.
- Non-Final Office Action; U.S. Appl. No. 11/507,683; Mailed on Sep. 18, 2008, 8 pages.
- Non-Final Office Action; U.S. Appl. No. 11/607,550; Mailed on Mar. 2, 2009, 11 pages.
- Non-Final Office Action; U.S. Appl. No. 11/607,550; Mailed on Jun. 17, 2010, 12 pages.
- Non-Final Office Action; U.S. Appl. No. 11/679,100; Mailed on Oct. 16, 2008, 11 pages.
- Non-Final Office Action; U.S. Appl. No. 11/679,100; Mailed on May 28, 2010, 9 pages.
- Non-Final Office Action; U.S. Appl. No. 11/679,136; Mailed on Aug. 18, 2008, 6 pages.
- Non-Final Office Action; U.S. Appl. No. 11/679,136; Mailed on Aug. 28, 2008, 8 pages.
- Non-Final Office Action; U.S. Appl. No. 11/679,169; Mailed on Apr. 28, 2009, 11 pages.
- Non-Final Office Action; U.S. Appl. No. 11/679,832; Mailed on Aug. 28, 2009, 9 pages.
- Non-Final Office Action; U.S. Appl. No. 11/739,077; Mailed on Oct. 8, 2009, 7 pages.
- Non-Final Office Action; U.S. Appl. No. 11/740,908; Mailed on Jan. 29, 2010, 8 pages.
- Non-Final Office Action; U.S. Appl. No. 11/746,551; Mailed on Apr. 14, 2010, 8 pages.
- Non-Final Office Action; U.S. Appl. No. 11/801,341; Mailed on Jan. 13, 2009, 7 pages.
- Non-Final Office Action; U.S. Appl. No. 11/844,980; Mailed on Aug. 21, 2008, 8 pages.
- Non-Final Office Action; U.S. Appl. No. 11/846,408; Mailed on Aug. 18, 2008, 8 pages.
- Non-Final Office Action; U.S. Appl. No. 11/853,745; Mailed on Jun. 19, 2009, 11 pages.
- Non-Final Office Action; U.S. Appl. No. 11/853,763; Mailed on Dec. 22, 2008, 6 pages.
- Non-Final Office Action; U.S. Appl. No. 12/117,668; Mailed on Aug. 13, 2009, 15 pages.
- Non-Final Office Action; U.S. Appl. No. 12/177,032; Mailed on Feb. 23, 2010, 6 pages.
- Non-Final Office Action; U.S. Appl. No. 12/209,113; Mailed on Sep. 23, 2009, 6 pages.
- Non-Final Office Action; U.S. Appl. No. 12/276,229; Mailed on Aug. 30, 2010, 8 pages.
- Non-Final Office Action; U.S. Appl. No. 12/476,041; Mailed on Nov. 18, 2009, 6 pages.
- Non-Final Office Action; U.S. Appl. No. 12/037,336; Mailed on Sep. 15, 2010, 33 pages.
- Precision Shooting, Inc., Bald Eagle Front Rest, The Accurate Rifle, vol. 6, Issue No. 4, May 2003, p. 47.
- Protektor Model, "The Original Leather Rifle and Pistol Rest," <http://www.protektormodel.com/>, 12 pages [Internet accessed on Feb. 14, 2006].
- RCBS Automatic Primer Tool, pp. 68-71, undated.
- RCBS, "Reloading Equipment," <http://www.rcbs.com/default.asp?menu=1&s1=4&s2=3&s3=25>, 1 page [Internet accessed Apr. 24, 2007].
- Shooters Ridge, "Deluxe Rifle Rest," <http://www.shootersridge.com>, 1 page [Internet accessed Jul. 21, 2008].
- Shooters Ridge, "Shooting Rest with Gun Vise," <http://www.shootersridge.com>, 1 page [Internet accessed Jul. 17, 2008].
- Sinclair International, Sinclair Shooting Rests, Products for the Precision Shooter, 2002, Issue No. 2002-B pp. 76-78.
- Sweeney, P., "Gunsmithing: Measure Headspace," Peterson's Rifleshooter, http://www.rifleshooter.com/gunsmithing/headspace_0612/, 4 pages [Internet accessed Dec. 11, 2004].
- Tenex Precision Co., "Recoil A-Rest-R," 4 pages, date unknown [product photos].
- The Blue Press, "Dillon Case Preparation Equipment," <http://dillonprecision.com/template/p.cfm?maj=16&min=0&dyn=1&>, Apr. 2007, 2 pages [Internet accessed Apr. 24, 2007].
- Non-Final Office Action; U.S. Appl. No. 11/746,551; Mailed on Jul. 8, 2011, 14 pages.
- Non-Final Office Action; U.S. Appl. No. 12/769,438; Mailed on Jul. 15, 2011, 55 pages.
- Non-Final Office Action; U.S. Appl. No. 12/276,223; Mailed on Jul. 19, 2011, 11 pages.
- Non-Final Office Action; U.S. Appl. No. 12/177,032; Mailed on Aug. 15, 2011, 9 pages.
- Non-Final Office Action; U.S. Appl. No. 12/172,848; Mailed on Nov. 22, 2010, 32 pages.
- Non-Final Office Action; U.S. Appl. No. 11/206,430; Mailed on Oct. 14, 2010, 18 pages.
- Non-Final Office Action; U.S. Appl. No. 11/844,980; Mailed on Dec. 16, 2010, 9 pages.
- Non-Final Office Action; U.S. Appl. No. 12/276,223; Mailed on Dec. 27, 2010, 37 pages.
- Non-Final Office Action; U.S. Appl. No. 11/431,956; Mailed on Feb. 9, 2011, 13 pages.
- Final Office Action; U.S. Appl. No. 11/679,100; Mailed on Feb. 18, 2011, 11 pages.
- Final Office Action; U.S. Appl. No. 11/206,430; Mailed on May 12, 2011, 14 pages.
- U.S. Appl. No. 11/505,784, filed Aug. 16, 2006, Cauley.
- U.S. Appl. No. 11/862,821, filed Sep. 27, 2007, Cesternino.

US 8,464,628 B2

Page 9

Ishop2.com "Hoppe's Gunsmith's Fully Adjustable Bench Vise" 3 pages. The date on which the Hoppe's Gunsmith's Fully Adjustable Bench Vise was first on sale is not known, but is believed to be circa 2004.

Auto-Flo Lyman Turbo 1200 Tumbler, 2 pages [product photos].

Battenfeld Technologies, Inc., "Gun Vise," Tipton Gun Cleaning Supplies, Battenfeld Technologies, Inc. 2004 Catalog, p. 32, Product No. 782-731, 2 pgs.

European Search Report; European Patent Application No. 07863915.0; Filed: Nov. 5, 2007; Applicant: Battenfeld Technologies, Inc.; Mailed on Oct. 14, 2010.

Final Office Action; U.S. Appl. No. 11/679,100; Mailed on Feb. 18, 2011, 11 pages.

Final Office Action; U.S. Appl. No. 12/848,649; Mailed on Jan. 18, 2012, 6 pages.

Non-Final Office Action; U.S. Appl. No. 11/607,550; Mailed on 11/23/11, 8 pages.

Non-Final Office Action; U.S. Appl. No. 12/614,578; Mailed on Dec. 8, 2011, 12 pages.

Non-Final Office Action; U.S. Appl. No. 12/899,418; Mailed on Jan. 3, 2012, 30 pages.

Non-Final Office Action; U.S. Appl. No. 11/431,956; Mailed on May 7, 2012, 10 pages.

Non-Final Office Action; U.S. Appl. No. 13/095,549; Mailed on Feb. 7, 2012, 13 pgs.

Non-Final Office Action; U.S. Appl. No. 13/183,212; Mailed on Apr. 2, 2012, 8 pages.

Non-Final Office Action; U.S. Appl. No. 13/344,280; Mailed on Feb. 27, 2012, 9 pages.

* cited by examiner

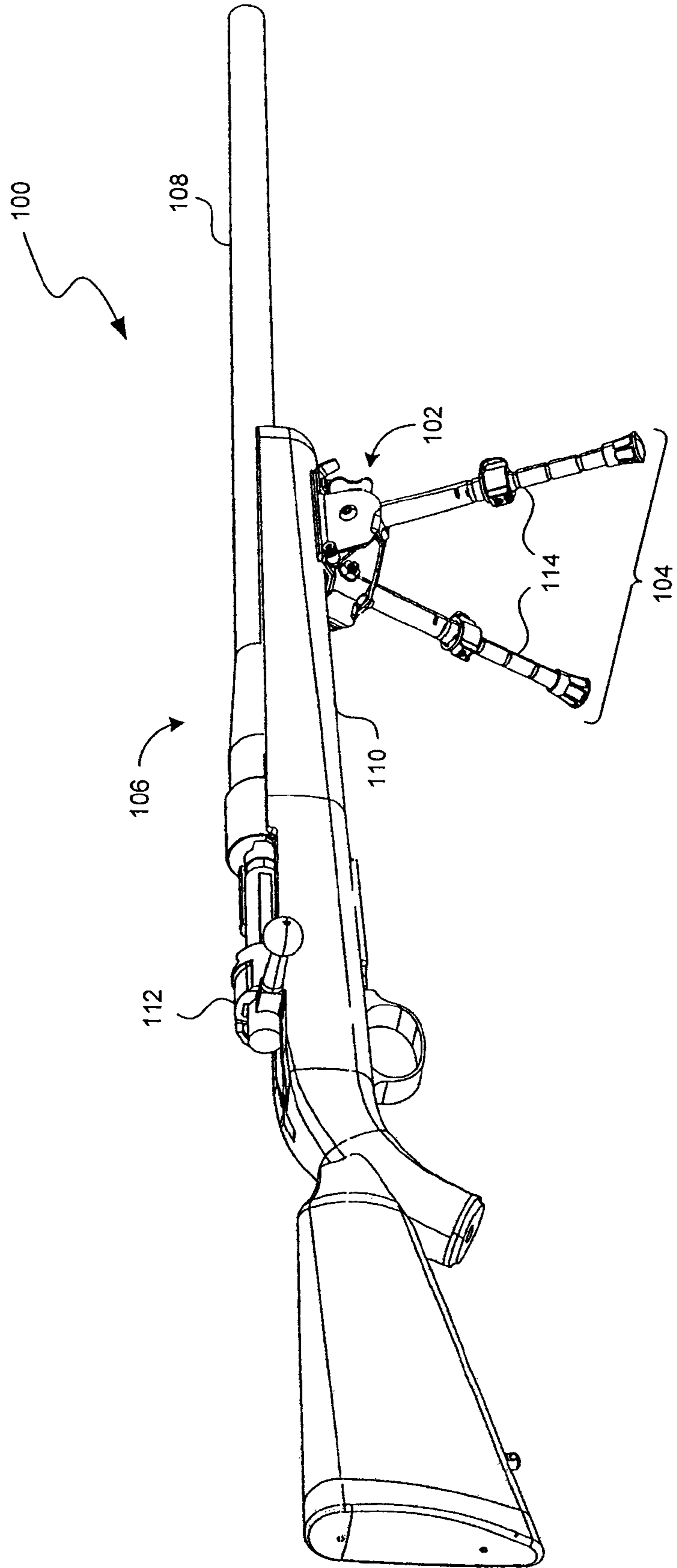


FIG. 1

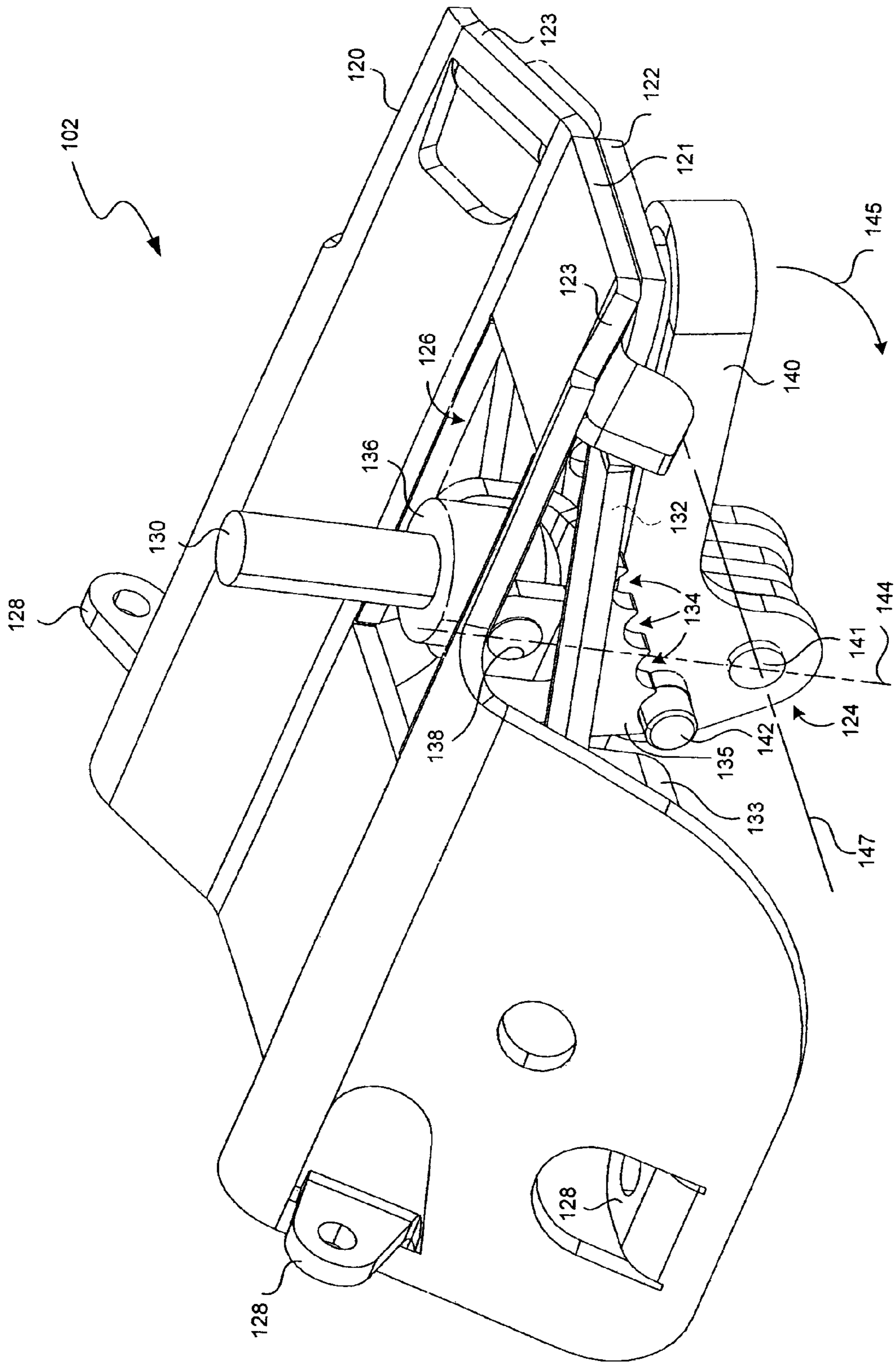


FIG. 2

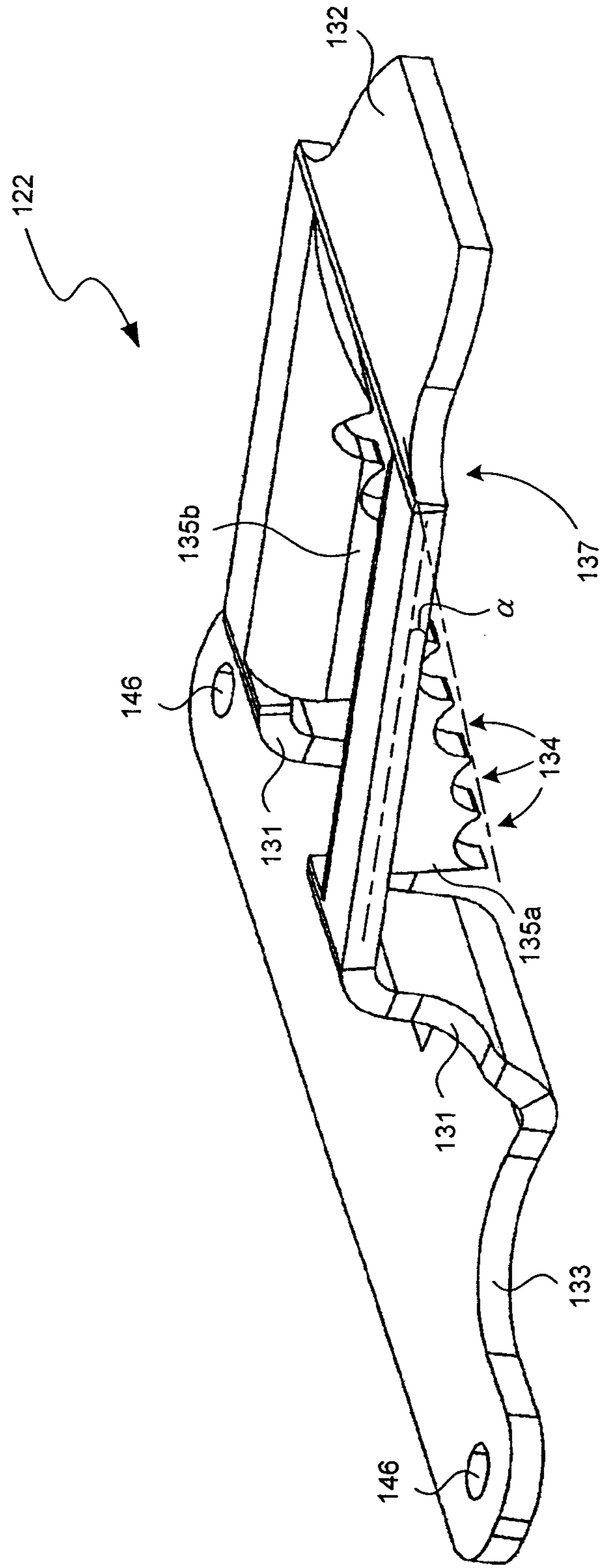


FIG. 3

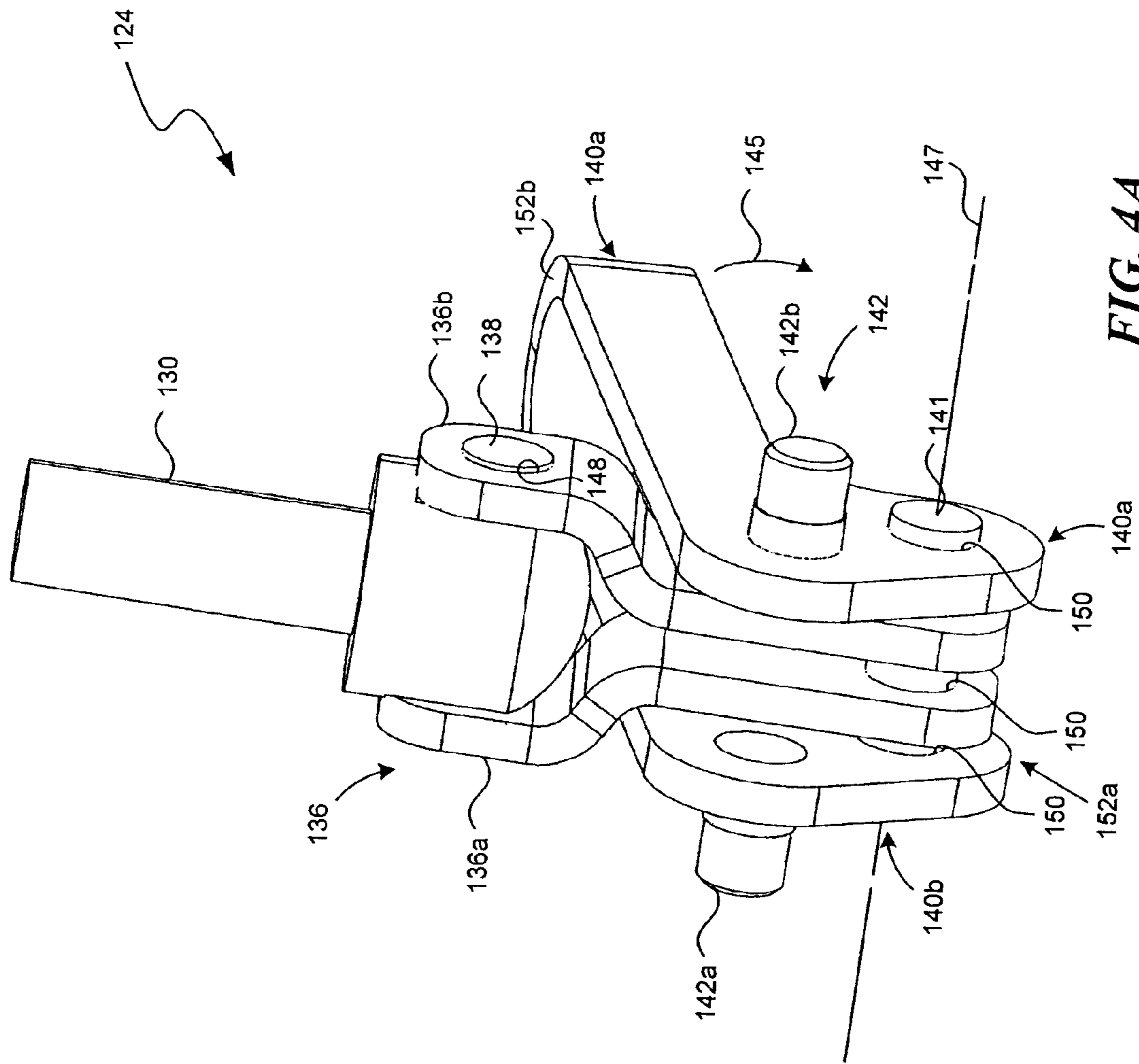


FIG. 4A

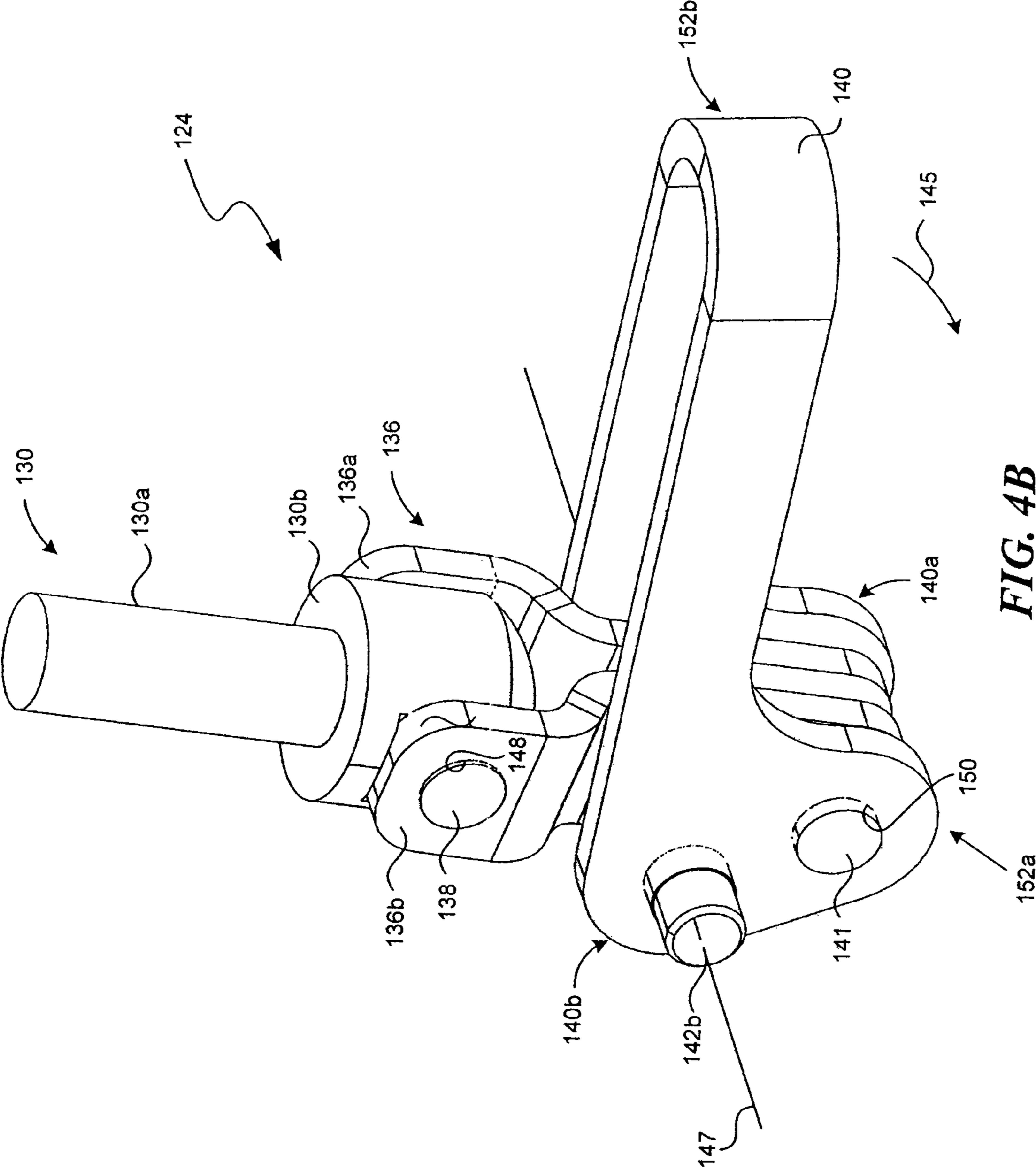


FIG. 4B

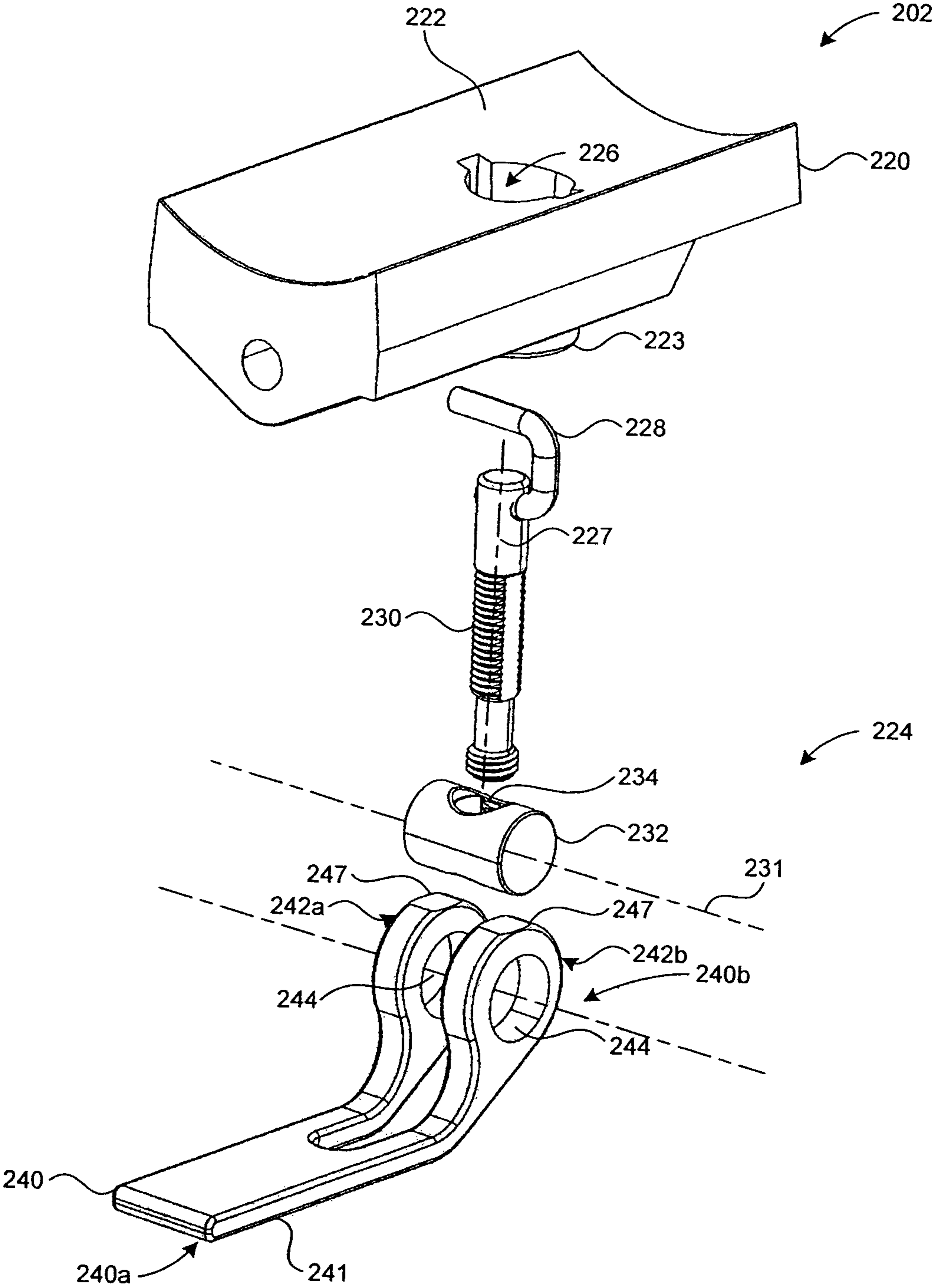


FIG. 5A

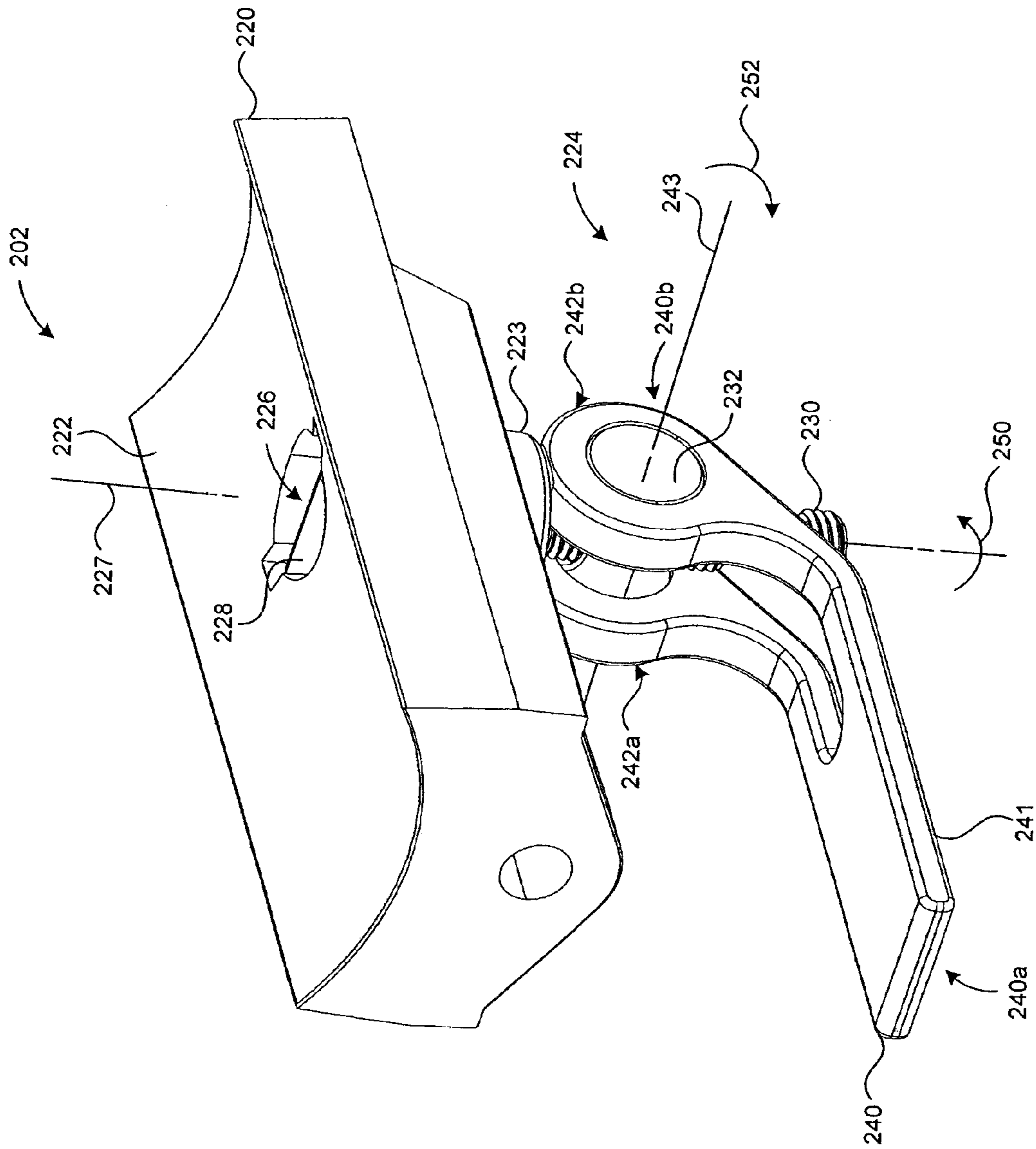


FIG. 5B

1

ATTACHMENT MECHANISMS FOR COUPLING FIREARMS TO SUPPORTING STRUCTURES

CROSS-REFERENCE TO RELATED APPLICATION

The present application is a divisional of U.S. patent application Ser. No. 12/209,113, filed Sep. 11, 2008, now U.S. Pat. No. 7,845,267, which claims priority to U.S. Provisional Application Ser. No. 60/971,507, filed Sep. 11, 2007, the disclosures of which are incorporated herein by reference in their entirety.

TECHNICAL FIELD

The present disclosure is generally related to attachment mechanisms for attaching firearms to support structures, e.g., bipods.

BACKGROUND

In recent centuries, firearms have been widely used for hunting games or waging wars. To achieve precision in using firearms, monopods, bipods, tripods, gun carriages, and/or other support structures are typically attached to firearms for providing stability during firing. However, the support structures can reduce the portability of the firearms by increasing the weight and the size of the complete assemblies. Accordingly, attachment mechanisms that can enable quick attachment/detachment of the support structures to/from the firearms are needed for improved operability.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of a firearm assembly in accordance with an embodiment of the disclosure.

FIG. 2 is an isometric view of an embodiment of an attachment mechanism suitable for use in the firearm assembly of FIG. 1 in accordance with an embodiment of the disclosure.

FIG. 3 is an isometric view of an embodiment of a mounting member in FIG. 2 in accordance with an embodiment of the disclosure.

FIGS. 4A-B are isometric views of an embodiment of a latching subassembly in FIG. 2 in accordance with an embodiment of the disclosure.

FIG. 5A is an exploded isometric view of an embodiment of an attachment mechanism suitable for use in the firearm assembly of FIG. 1 in accordance with another embodiment of the disclosure.

FIG. 5B is an isometric view of the attachment mechanism in FIG. 5A as assembled in accordance with another embodiment of the disclosure.

DETAILED DESCRIPTION

Specific details of several embodiments of the disclosure are described below with reference to embodiments of an attachment mechanism for attaching a support structure (e.g., a bipod) to a firearm. The term “firearm” generally refers to a device that can discharge a projectile with a propellant (e.g., a combustion gas, compressed air, etc.) Examples of a firearm include rifles, machine guns, muskets, air rifles/pistols, etc. Several other embodiments may have different configurations, components, or procedures than those described in this section. A person of ordinary skill in the art, therefore, will accordingly understand that the disclosure may have other

2

embodiments with additional elements, or the invention may have other embodiments without several of the elements shown and described below.

FIG. 1 is an isometric view of a firearm assembly 100 in accordance with an embodiment of the disclosure. As illustrated in FIG. 1, the firearm assembly 100 can include a firearm 106, a support structure 104, and an attachment mechanism 102 connecting the support structure 104 to the firearm 106. The firearm 106 can include a barrel 108 operatively coupled to a firing mechanism 112 (e.g., a bolt-action firing mechanism), and a stock 110 at least partially supporting and/or housing the barrel 108 and the firing mechanism 112. The firearm 106 is generally illustrated in FIG. 1 as a rifle; however, in other embodiments, the firearm 106 can also be a handgun, a machine gun, and/or other types of firearm.

In the illustrated embodiment, the support structure 104 includes a bipod 114 extending from the stock 110 of the firearm 106. In certain embodiments, the bipod 114 can include two cylindrical tubes constructed from a metal, a metal alloy, a polymeric material, and/or other suitable material with sufficient strength. In other embodiments, the bipod 114 can also include springs, sleeves, pivots, and/or other features for collapsing the bipod 114 for storage and/or transport. In further embodiments, the support structure 104 can also include a monopod, a tripod, a gun carriage, and/or other support devices that can provide support to the firearm during use.

The attachment mechanism 102 can be positioned between the firearm 106 and the support structure 104. In one aspect of this embodiment, the attachment mechanism 102 can be configured to releasably attach/detach the support structure 104 to/from the firearm 106. In another aspect of this embodiment, the attachment mechanism 102 can be configured to enable a quick release of the support structure 104 from the firearm 106 for improving operability of the firearm assembly 100, as described in more detail below with reference to FIGS. 2-4B.

Even though the firearm assembly 100 is illustrated in FIG. 1 to have particular components, in certain embodiments, the firearm assembly 100 can also include shoulder straps, telescopes, external magazines, and/or other accessories for the firearm 106. In other embodiments, portions of the stock 110 and/or other components of the firearm assembly 100 can be different and/or omitted.

FIG. 2 is an isometric view of an embodiment of the attachment mechanism 102 in FIG. 1 in accordance with an embodiment of the disclosure. As shown in FIG. 2, the attachment mechanism 102 can include an interface member 120, a mounting member 122 attached to the interface member 120, and a latching subassembly 124 movably coupled to the mounting member 122. In the illustrated embodiment, the interface member 120 and the mounting member 122 are shown as stand-alone components couplable with fasteners (e.g., bolts and nuts). However, in certain embodiments, the interface member 120 and the mounting member 122 can be formed integrally as a single component.

The interface member 120 can include a center portion 121 and two side portions 123 extending from the center portion 121. The center portion 121 and the side portions 123 can be arranged at an angle to receive and accommodate the stock 110 (FIG. 1). The center portion 121 can include an aperture 126 through which a connector 130 can extend to engage the stock 110. In one embodiment, the connector 130 can include a swivel stud. In other embodiments, the connector 130 can also include a threaded stud and/or other fasteners. The side portions 123 can also include connecting features, e.g., taps 128, for connecting to other components of the attachment

mechanism 102, the support structure 104 (FIG. 1), and/or other components of the firearm assembly 100 (FIG. 1).

The mounting member 122 can include a mounting plate 132 configured to engage the center portion 121 of the interface member 120, an anchor plate 133 configured to engage the side portions 123 of the interface member 120, and a receiving plate 135 extending from the mounting plate 132. The receiving plate 135 can include notches 134 and/or other engagement features for receiving the latching subassembly 124. Embodiments of the mounting member 122 are discussed in more detail below with reference to FIG. 3.

The latching subassembly 124 can include an attachment portion 136, a latching arm 140 movably coupled to the attachment portion 136 by a coupling pin 141, and a latching pin 142 extending outwardly from the latching arm 140 and resting in one of the notches 134 of the mounting member 122. In the illustrated embodiment, the attachment portion 136 is fixedly coupled to the connector 130 with a swivel pin 138. In other embodiments, the attachment portion 136 can be coupled to the connector 130 with a screw, a bolt, a nut, and/or other fasteners. Embodiments of the latching subassembly 124 are discussed in more detailed below with reference to FIGS. 4A-B.

Referring to FIG. 1 and FIG. 2 together, the attachment mechanism 102 can securely hold the firearm 106 and the support structure 104 together during use.

When assembled, the connector 130 is fixedly attached to the stock 110 of the firearm 106, and the attachment portion 136 is fixedly coupled to the connector 130. As a result, the latching subassembly 124 can force the stock 110 toward the attachment mechanism 102 via the connector 130 until the stock 110 securely rests on the interface member 120. Because different firearms may have different stock configurations (e.g., height, shape, etc.), a user can select one of the notches 134 that provides the required height between the latching pin 142 and the center portion 121 of the interface member 120 to securely engage the firearm 106.

During detachment, a user can pull the latching arm 140 clockwise (as indicated by an arrow 145) away from the mounting member 122. As the latching arm 140 pivots around the coupling pin 141, the latching pin 142 rotates toward an axis 144 that passes through the centers of the swivel pin 138 and the coupling pin 141. As a result, the rotation of the latching arm 140 pulls the stock 110 toward the interface member 120 because the distance between the swivel pin 138 and the coupling pin 141 increases. As all three pins (i.e., the swivel pin 138, the coupling pin 141, and the latching pin 142) are aligned along the axis 144, the attachment mechanism 102 exerts the maximum pulling force on the stock 110. As the user continues to pull the latching arm 140 clockwise, the latching pin 142 passes and moves away from the axis 144. As a result, the amount of pulling force exerted on the stock 110 is reduced because the distance between the swivel pin 138 and the coupling pin 141 decreases. As the user continues to pull the latching arm 140 clockwise, the pressure between the stock 110 and the interface member 120 can be reduced or even eliminated. After the pressure is at least reduced, the user can detach the attachment mechanism 102 from the stock 110 by removing the swivel pin 138.

FIG. 3 is an isometric view of an embodiment of the mounting member 122 in FIG. 2 in accordance with an embodiment of the disclosure. As illustrated in FIG. 3, the mounting member 122 includes the mounting plate 132, the anchor plate 133, and an intermediate portion 131 connecting the mounting plate 132 and the anchor plate 133. In the illustrated embodiment, the mounting plate 132 and the anchor plate 133 are offset from one another; however, in other embodiments,

these components can be generally planar. The anchor plate 133 can include connecting features 146 (e.g., holes) for coupling to the interface member 120 (FIG. 2) and/or other components of the attachment mechanism 102.

The mounting plate 132 can also include an opening 137 configured to at least partially align with the aperture 126 (FIG. 2) of the interface member 120. The mounting member 122 also includes a first receiving plate 135a and a second receiving plate 135b having the notches 134 and extending from the mounting plate 132 along two sides of the opening 137. As shown in FIG. 3, the tops of the notches 134 form generally a line at an angle α with the mounting plate 132. The angle α can be from about 5° to about 85°, preferably from about 15° to about 60°, and more preferably from about 25° to about 45°.

FIGS. 4A-B are isometric views of an embodiment of the latching subassembly 124 in FIG. 2 in accordance with an embodiment of the disclosure. As shown in FIGS. 4A-B, the latching subassembly 124 includes the attachment portion 136, the latching arm 140, and the coupling pin 141 pivotably coupling the attachment portion 136 and the latching arm 140 together.

The latching arm 140 includes first and second latching sections 140a-b spaced apart from one another and are eccentric relative to a latching axis 147 at a first end 152a proximate to the coupling pin 141. The latching arm 140 also includes a first latching pin 142a and a second latching pin 142b extending from the first and second latching sections 140a-b, respectively. The first and second latching sections 140a-b can be joined at a second end 152b spaced apart from the first end 152a. The attachment portion 136 can include a first attachment section 136a and a second attachment section 136b spaced apart from the first attachment section 136a at a distance suitable for accommodating the connector 130. Each of the first and second latching sections 140a-b and the first and second attachment sections 136a-b can include first apertures 150 that can be aligned along the latching axis 147 to allow the coupling pin 141 to extend through. The first and second attachment sections 136a-b can also include second apertures 148 that can be aligned to allow the swivel pin 138 to extend through. As a result, the latching arm 140 can pivot eccentrically relative to the attachment portion 136 around the latching axis 147, as indicated by the arrow 145.

FIG. 5A is an exploded isometric view of an embodiment of an attachment mechanism 202 suitable for use in the firearm assembly 100 of FIG. 1 in accordance with another embodiment of the disclosure. The attachment mechanism 202 can include an interface member 220 and a latching subassembly 224 releasably coupled to the interface member 220.

The interface member 220 can include a first surface 222 that is curved to accommodate the stock 110 (FIG. 1) and a second surface 223 opposite the first surface 222 and proximate to the latching assembly 224. The interface member 220 can also include an interface aperture 226 extending from the first surface 222 to the second surface 223. As shown in FIG. 5A, The interface aperture 226 can have a generally circular cross-section with a stepped slot that extends radially outwardly. In other embodiments, the interface aperture 226 can have other cross-section configurations to accommodate the latching subassembly 224.

The latching subassembly 224 can include a attachment portion 228 fixedly or releasably attached to a threaded shaft 230. As shown in FIG. 5A, the attachment portion 228 includes a generally cylindrical bar that can engage the attachment portion 136 (FIG. 4A) by extending through the second apertures 148 (FIG. 4A). In other embodiments, the

5

attachment portion **228** can also include a pin, a screw, and/or another fastening mechanism. In the illustrated embodiment, the threaded shaft **230** extends along a shaft axis **227** and has interrupted threads. In other embodiments, the threaded shaft **230** can have non-interrupted threads and/or other configurations.

The latching subassembly **224** can also include a bushing **232** having a threaded aperture **234** to engage the threaded shaft **230**. In the illustrated embodiment, the bushing **232** has a generally cylindrical shape extending along a bushing axis **231**. The threaded aperture **234** extends through the bushing **232** generally perpendicularly relative to the bushing axis **231**. In other embodiments, the bushing **232** can having other configurations.

The latching subassembly **224** can further include a latching arm **240** releasably coupled to the bushing **232**. The latching arm **240** includes a handle **241** at a first end **240a** and first and second forks **242a-b** spaced apart from one another and extending from the handle **241** toward a second end **240b** opposite the first end **240a**. The first and second forks **242a-b** each include a cam structure **247** having an latching aperture **244** generally aligned along a latching axis **243** to receive the bushing **232**. At least one of the cam structures **247** can be eccentric relative to the latching axis **243**.

FIG. 5B is an isometric view of the attachment mechanism **202** in FIG. 5A as assembled in accordance with another embodiment of the disclosure. During assembly, the attachment portion **228** can be first engaged with the attachment portion **136** (FIG. 4A) by extending through the second apertures **148** (FIG. 4A). Then, the interface member **220** can be positioned against the stock **110** (FIG. 1) by having the threaded shaft **230** sliding through the interface aperture **226** until the attachment portion **228** rests on the stepped slot. Then, the threaded shaft **230** can extend through the bushing **232** that is received in the latching apertures **244** until the first and second forks **242a-b** are proximate to the second surface **223** of the interface member **220**. The latching arm **240** can then be rotated approximately 90° around the shaft axis **227** to engage threads of the threaded shaft **230**. Then, the handle **241** can be rotated around the latching axis. As the latching arm **240** rotates, the cam structures **247** press against the second surface **223** of the interface member **220** to pull the stock **110** toward the bushing **232** in order to secure the attachment mechanism **202** to the stock **110**.

In any of the embodiments discussed above, the attachment mechanisms can allows a user to attached/detach a support structure to/from a firearm without using tools and with improved attachment security over conventional techniques. According to conventional techniques, a threaded rod is typically used to couple to a swivel stud on a gun stock. A support structure (e.g., a bipod) is then attached to the stock and tightened by running a nut against the threaded rod. However, the motion of the bipod can cause the nut to come loose over time to undermine the attachment security. One conventional method to solve this problem is using tools to tighten the nut. However, such tools may not be available in the field. Embodiments of the attachment mechanisms solved this problem by using the latching arms with cam structures that can be rotated to exert resistance to the stock so that the bipod is less likely to come loose over time.

From the foregoing, it will be appreciated that specific embodiments of the invention have been described herein for purposes of illustration, but that various modifications may be made without deviating from the invention. Elements of one embodiment may be combined with other embodiments in

6

addition to or in lieu of the elements of the other embodiments. Accordingly, the invention is not limited except as by the appended claims.

We claim:

1. An attachment mechanism for attaching a firearm to a support structure, comprising:

an interface member having an aperture and first side opposite a second side, wherein the first side is configured to contact the firearm; and

a latching subassembly proximate to the interface member, the latching assembly including—

an attachment portion configured to engage a connector extending from the firearm through the aperture; and

a latching arm coupled to the attachment portion and movable about a latching axis, the latching arm having an end portion including a cam structure configured to contact the second side of the interface member, and wherein the cam structure has a latching aperture through which the latching axis passes, and wherein the cam structure is at least partially eccentric relative to the latching axis.

2. The attachment mechanism of claim 1 wherein the latching arm pivots about the latching axis from an open position to a closed position to lockably engage the second side of the interface member and to secure the first side of the interface member against the firearm.

3. The attachment mechanism of claim 1 wherein the attachment portion includes a shaft having a shaft axis extending longitudinally along the shaft, wherein the shaft axis is generally perpendicular to the latching axis.

4. The attachment mechanism of claim 1 wherein the cam structure includes a first cam structure spaced apart from a second cam structure.

5. The attachment mechanism of claim 4 wherein each of the first and second cam structures includes a generally flat portion that contacts the second side of the interface member to at least partially secure the interface member against the firearm when the latching arm is in a closed position with reference to the interface member.

6. The attachment mechanism of claim 4 wherein the latching subassembly further comprises a bushing coupled to the attachment portion, wherein the bushing at least partially extends through each of the first and second cam structures.

7. The attachment mechanism of claim 6 wherein the bushing is rotatably coupled to the shaft and rotates on the shaft, and wherein the latching arm is pivotally coupled to the bushing and the cam structure rotates on the bushing.

8. An attachment mechanism for attaching a firearm to a bipod, comprising:

an interface member having an aperture;

an attachment portion configured to releasably engage a stud extending from the firearm through the aperture;

a shaft having a first end portion coupled to the attachment portion and a second end portion opposite the first end portion, the shaft having a longitudinal axis;

a bushing coupled to the second end portion of the shaft; and

a latching arm coupled to the bushing, wherein the latching arm moves about a latching axis between open and closed positions, wherein the latching axis is generally perpendicular to the longitudinal axis of the shaft, and wherein in the closed position the latching arm at least partially secures the interface member against the firearm wherein the latching arm includes a bushing opening that receives the bushing, and wherein the center of the bushing opening is eccentric with reference to the latching axis.

9. An attachment mechanism for attaching a firearm to a bipod, comprising:

- an interface member having an aperture;
- an attachment portion configured to releasably engage a stud extending from the firearm through the aperture;
- a shaft having a first end portion coupled to the attachment portion and a second end portion opposite the first end portion, the shaft having a longitudinal axis;
- a bushing coupled to the second end portion of the shaft;
- and
- a latching arm coupled to the bushing, wherein the latching arm moves about a latching axis between open and closed positions, wherein the latching axis is generally perpendicular to the longitudinal axis of the shaft, and wherein in the closed position the latching arm at least partially secures the interface member against the firearm, wherein the latching arm includes a cam structure that rotates about the bushing, and wherein the cam structure includes a generally planar section that contacts the second surface of the interface member when the latching arm is in the closed position.

10. An attachment mechanism for attaching a firearm to a bipod, comprising:

- an interface member having an aperture;
- an attachment portion configured to releasably engage a stud extending from the firearm through the aperture;
- a shaft having a first end portion coupled to the attachment portion and a second end portion opposite the first end portion, the shaft having a longitudinal axis;
- a bushing coupled to the second end portion of the shaft;
- and
- a latching arm coupled to the bushing, wherein the latching arm moves about a latching axis between open and closed positions, wherein the latching axis is generally perpendicular to the longitudinal axis of the shaft, and wherein in the closed position the latching arm at least partially secures the interface member against the firearm wherein the latching arm includes a first cam portion spaced apart from a second cam portion, and wherein the bushing extends laterally between the first cam portion and the second cam portion.

11. The attachment assembly of claim 10 wherein the shaft extends at least partially through the bushing in between the first cam portion and the second cam portion.

12. An attachment mechanism for attaching a firearm to a bipod, comprising:

- an interface member having an aperture;
- an attachment portion configured to releasably engage a stud extending from the firearm through the aperture;
- a shaft having a first end portion coupled to the attachment portion and a second end portion opposite the first end portion, the shaft having a longitudinal axis;
- a bushing coupled to the second end portion of the shaft wherein the bushing includes a threaded opening that receives a threaded portion of the shaft; and
- a latching arm coupled to the bushing, wherein the latching arm moves about a latching axis between open and closed positions, wherein the latching axis is generally

perpendicular to the longitudinal axis of the shaft, and wherein in the closed position the latching arm at least partially secures the interface member against the firearm.

13. An attachment mechanism for attaching a firearm to a bipod, comprising:

- an interface member having an aperture;
- an attachment portion configured to releasably engage a stud extending from the firearm through the aperture;
- a shaft having a first end portion coupled to the attachment portion and a second end portion opposite the first end portion, the shaft having a longitudinal axis;
- a bushing coupled to the second end portion of the shaft wherein the bushing rotates on the shaft about the longitudinal axis, and the latching arm rotates on the bushing about the latching axis; and
- a latching arm coupled to the bushing, wherein the latching arm moves about a latching axis between open and closed positions, wherein the latching axis is generally perpendicular to the longitudinal axis of the shaft, and wherein in the closed position the latching arm at least partially secures the interface member against the firearm.

14. An attachment assembly for securing a firearm to a support structure, the attachment assembly comprising:

- an interface member configured to contact the firearm, the interface member having an aperture configured to receive a connector extending from the firearm; and
- a latching subassembly including—
 - an attachment portion configured to releasably engage the connector;
 - a shaft extending from the attachment portion; and
 - a latching arm coupled to the shaft, wherein the latching arm includes a handle at a first end portion and first and second spaced apart forks at a second end portion, and wherein the shaft extends at least partially between the first and second forks wherein the latching arm pivots about a latching axis that is generally perpendicular to the longitudinal axis of the shaft.

15. The attachment assembly of claim 14, further comprising a bushing attached to the shaft, wherein the bushing extends through each of the first and second forks.

16. The attachment assembly of claim 15 wherein the latching arm rotates on the bushing about a latching axis, and wherein each of the first and second forks is eccentric relative to the latching axis.

17. The attachment assembly of claim 14 wherein each of the first and second forks includes a generally flat portion that contacts the interface member to lock the latching subassembly when the latching arm is moved to a closed position with reference to the interface member.

18. The attachment assembly of claim 14 wherein the latching subassembly further comprises a bushing coupled to the shaft and spaced apart from the attachment portion, wherein the bushing extends through at least a portion of the first fork and the second fork.